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PEOPLE AND PLACES
Forever young in Cuba

PLANET
Millennium bugs with a deadly bite

CONNEXIONS
Internet and paedophilia

INTERVIEW
Sunila Abeysekera, peace campaigner in Sri Lanka

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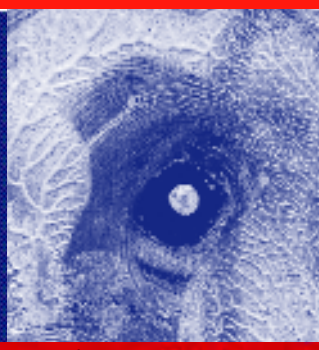

September 1999

BIOETHICS
The lure of the perfect child

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© Grégoire Korganow/Métis, Paris

A bride at her parents' home, just before a Havana wedding. The divorce rate in Cuba is high, and it is not uncommon for Cubans to marry three or four times.

FOREVER TWENTY IN CUBA

◆ Photos by Grégoire Korganow
Text by Antonio José Ponte

Cuba's young men and women in a hurry face up to a frustrating situation where time seems to stand still

I Spend an evening in Havana or some other Cuban town such as Matanzas or Pinar del Río and you get the feeling time is at a standstill. The past slips away, and the future is a long time coming, so you are left stuck in the present. To be 20 years old in Cuba is to be 20 years old for ever. It is either a wonderful gift or a refined form of torment. The choice is yours.

Twenty is an age when you most feel the immensity of time. Young people have many hopes, but they are quickly betrayed. After three or four dreams have come to nothing, those that are left seem vain. Impatience makes you see everything that happens in the same way. You haven't yet learned the adult art of concealing boredom.

Asking young Cubans about the future, or—to put it more bluntly—about their destiny, is like asking them for a false address. They'll say they've never heard of it, that it doesn't exist. The shrewdest of them will say that the future is elsewhere, not here.

When you're 20, you want to be somewhere else, far away. Perhaps most 20-year-olds feel like that, all over the world. They certainly do in Cuba. The capital and provincial towns and villages are full—crowded and empty at the same time—of things that signify nothing. You're at the ideal age to enter a new world, but you find the world around you has already been taken over by others who got there before you.

It isn't possible to create anything new in a country at the end of its history. Revolutions come to power to make sure that governments stand still, on the ▶

◆ Photos on pages 3-8 are taken from *Avoir 20 ans à La Havane*, by Grégoire Korganow and Jean Springer, published by Editions Alternatives, Paris, 1998. Antonio José Ponte is a Cuban writer and poet (see page 6).

grounds that there have already been enough changes in the country's history.

When you are young, you tend to look for things that have not been fouled up by earlier generations, things that they did not know about and so are untainted by their approval.

Fed up with provincial life, people can set their sights on moving to Havana, while people tired of Havana will want to leave the country. Afterwards, often when it's impossible to return, they will want to be back in Havana, or in some provincial town or village. The reason for such wanderings is partly biological, partly political. Or rather totally biological and totally political, if we accept that in cities human biology has become political.

Photos © Grégoire Korganow/Métis, Paris

A sugarcane processing plant near Cienfuegos in central Cuba. Before its collapse, the USSR bought on preferential terms almost half Cuba's sugar harvest, which then amounted to some 7 million tons a year. The yield fell to 3.2 million tons in 1998.

A thirst for adventure

The Cuban government has often managed to turn this desire to escape to its own advantage. Taking part in other countries' wars, compulsory military service, schooling organized in the fields, and the mobilization of teenagers all exploit this need to leave home and slake a thirst for adventure. These are children's crusades, exceptional intervals in the prevailing stagnation.

Many are set on leaving—the youth who builds a raft and sneaks out of the country on it, those who try their luck in the U.S. immigration lottery, or sell their bodies to foreigners in the hope of getting help to leave the country. For people who live in the unending present, the best ploy is to saturate each moment with activity, until it gives way to the next. You can call that *joie de vivre* or a horror of the void—take your pick. Young people in Cuba are full of both.

A social experiment like the 1959 revolution, which has spent so many years defying the basic laws of economics, which imposes austerity as a way of thinking and poverty as a daily routine, is ▶

'THE MOST BEAUTIFUL LAND'

When Christopher Columbus landed on the island of Cuba in 1492, he wrote in his travel diary that he had come across "the most beautiful land ever seen by human eyes". Today the 110,860-sq.km island, the biggest in the Caribbean, has a population of about 11 million, more than half of them of mixed blood. One fifth of the population live in the capital, Havana.

Since the 1959 revolution, Cuba has been a communist state headed by Fidel Castro who, as well as being president is chairman of the Council of State and the Council of Ministers, first secretary of the Cuban Communist Party (the only permitted party) and commander-in-chief of the armed forces.

Education and health care for all have been two of the pillars of the revolution for the past 40 years. As a result, Cubans have a level of literacy only surpassed in Latin America by Argentina and Uruguay, and the region's highest life expectancy (76.1 years).

Several hundred Cuban doctors are presently working outside the country. The tradition of sending doctors abroad started soon after the revolution began and peaked between 1975 and 1989.

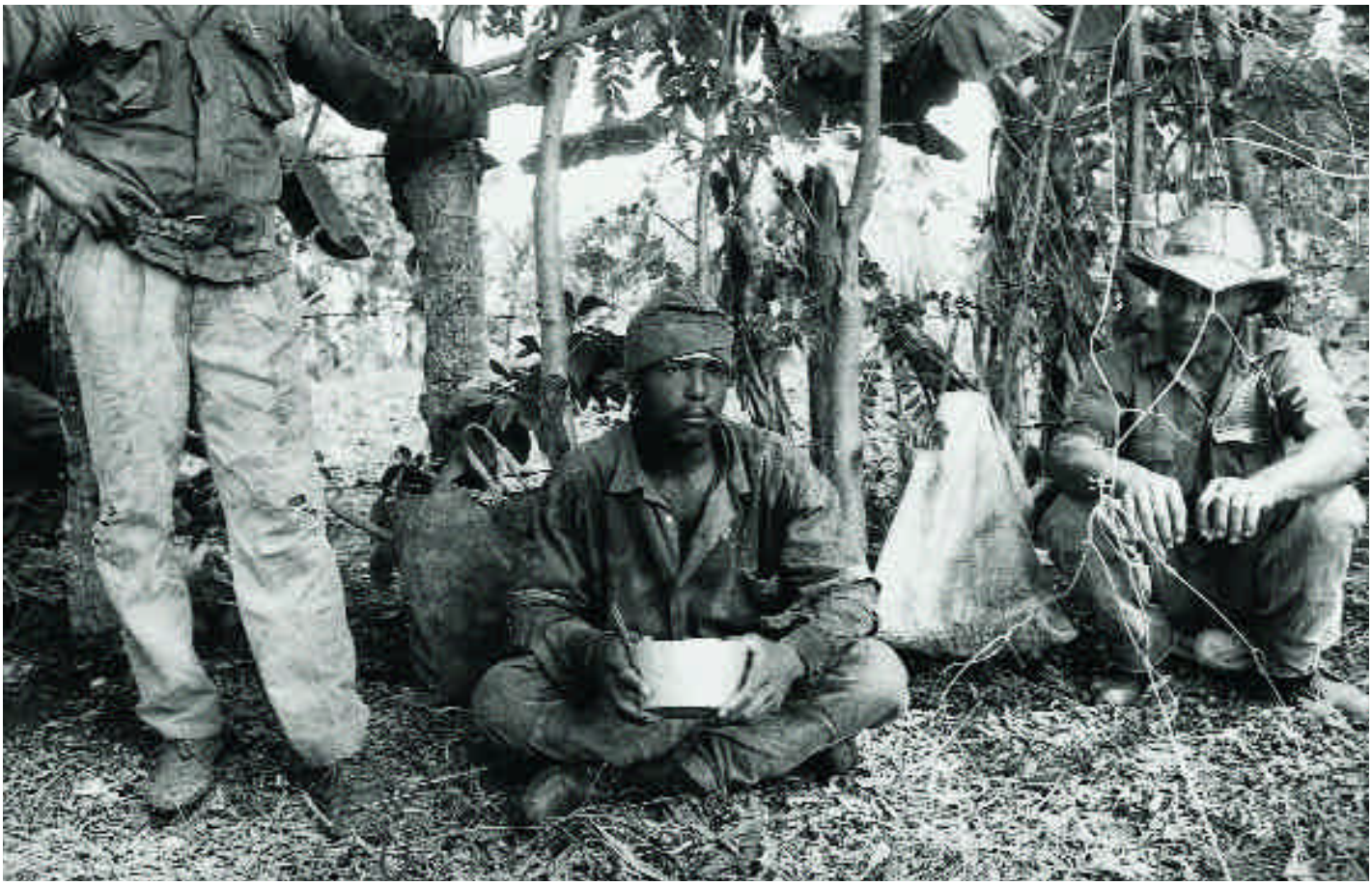
In the early 1990s, the collapse of the communist bloc plunged Cuba into a serious economic crisis. According to the Cuban government, the island's gross national product (GNP) fell by 35% between 1989 and 1993, and then rose by 2.5% in 1995, 7.8% in 1996 and 2.5% in 1997. According to United Nations statistics, Cuba's per capita GNP was $1,983 in 1995. Castro has cautiously opened up the country to foreign capital, allowed the free circulation of the U.S. dollar, and encouraged the development of tourism. These changes have led to the reappearance of social problems such as prostitution and petty crime which had been eradicated or had become insignificant.

In the political sphere, the one-party system continues to exist, the independent media cannot develop, and international human rights organizations deplore the way dissidents are treated. An estimated one million Cubans are thought to live in exile. ■

Photos © Grégoire Korganow/Métis, Paris

Tobacco is dried after being harvested near Pinar del Rio (in the west of the island). Cuba produced more than 160 million Havana cigars in 1998 and exported them to around 100 countries. The USA, Cuba's main customer before the revolution, still maintains a trade embargo on Cuban goods, including the famous cigars.

Sugarcane cutters near Santiago in southern Cuba. Sugar is white, brown and black–like Cuba's population since the time of the slave trade, say the poets.



Photos © Grégoire Korganow/Métis, Paris

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After work in a rural school (*escuela del campo*) near Pinar del Rio in western Cuba. Secondary school pupils over the age of 12 attend such schools for two months each year as a "social service in agriculture".

bound to produce young people with an outsized acquisitive instinct. To be 20 in Cuba is to be obsessed with money. A country where wages are paid in the national currency but where you can only live if you have foreign currency, incites people to flee, to go to the place where that currency comes from.

One might object that education will eventually change the situation of Cuban youngsters. But teachers' lessons do not deal with the real world. This is inevitable. Like all education, Cuban education teaches people to aspire, to want certain things, to achieve goals. But these are verbs that cannot be conjugated when time stands still, when there is a void. If the youngsters happen to get good training, it will simply equip them to live far away, abroad.

The equation boils down to shortages on the one hand, and money and beauty on the other. This is a discovery made at 20 which stays with you until the day you sink into oblivion and death.

In Cuba, at 20, you discover another reality: the inability to run your own life, or to try to balance the two sides of the equation. But long before you reach 20, you discover that what's lacking is freedom. ■

CUBA'S NEW WAVE OF WRITERS AND POETS

The poet and short story writer Antonio José Ponte was born in 1964 in Matanzas, about 100km east of Havana, and in 1980 moved to the Cuban capital where he studied hydraulics. After qualifying he worked as a hydraulic engineer for five years.

He has won Cuba's National Critics' Prize twice–in 1991 for *Poesia 1982-1989* ("Poetry 1982-1989", published by Letras Cubanas, Havana) and in 1995 for his book *Un seguidor de Montaigne mira La Habana* ("A disciple of Montaigne looks at Havana", published by Vigia, Matanzas). In 1995, he was awarded a writer's scholarship by the Alejo Carpentier Foundation in Havana. His first book, *Trece poemas* ("Thirteen Poems") was published in 1988 by the Cuban ministry of culture and won him the young poet's prize in the same year.

In 1997, he published *Asiento en las ruinas* ("A Seat in the Ruins", Letras Cubanas publishers) and a short story, *Corazón de Skitalietz* ("Heart of Skitalietz"). His latest book, *Las comidas profundas* ("Profound sustenance"), was published in Spanish in 1997 by the French publisher Deleatur, in Angers. This elegant and scholarly work, which is hard to categorize (it is neither a short story, nor an essay nor a novel) deals with the history of food and the relationship between human beings and what they eat.

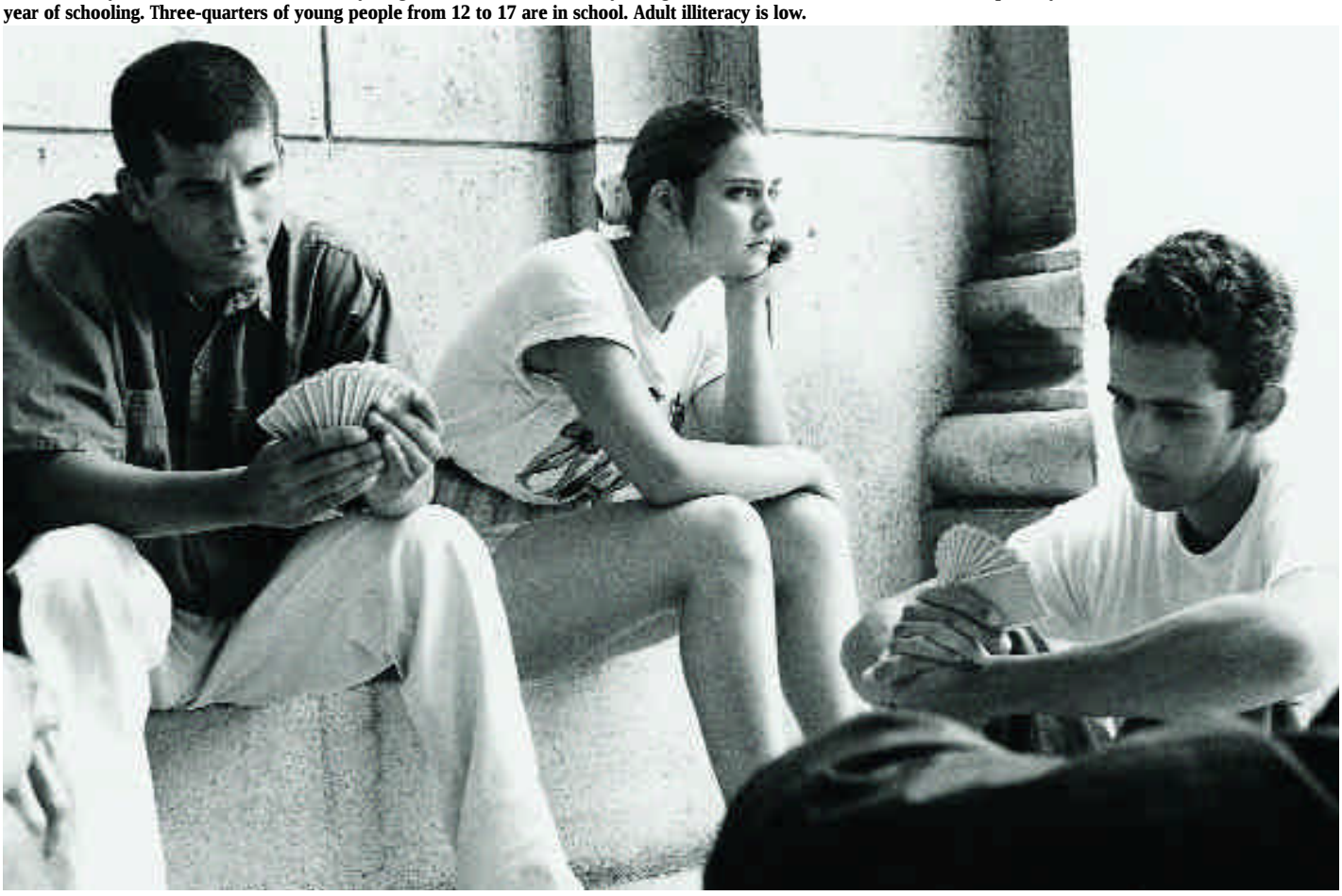
The International Writers' Parliament in Strasbourg recently awarded Ponte a one-year scholarship to live in Porto, Portugal, and write a novel. While in Portugal he will continue to contribute to the Cuban magazines *La Gaceta de Cuba*, *Union* (the magazine of the Cuban Writers' and Artists' Union, UNEAC), *Casas de las Americas* and *Letras Cubanas*.

At 34, Ponte is one of the new wave of young Cuban poets and writers, including Leonardo Padura, Abilio Estevez, Ronaldo Menendez Plasencia, Daniel Diaz Mantilla, Ismael González, Alessandra Molina and many others. ■

© Grégoire Korganow/Metis, Paris

Sunday on the beach, Santiago de Cuba.

The University of Havana. In 1995, 12.7% of young Cubans entered university, as against 20.1% in 1985. All children receive primary education and 94% reach the fifth year of schooling. Three-quarters of young people from 12 to 17 are in school. Adult illiteracy is low.



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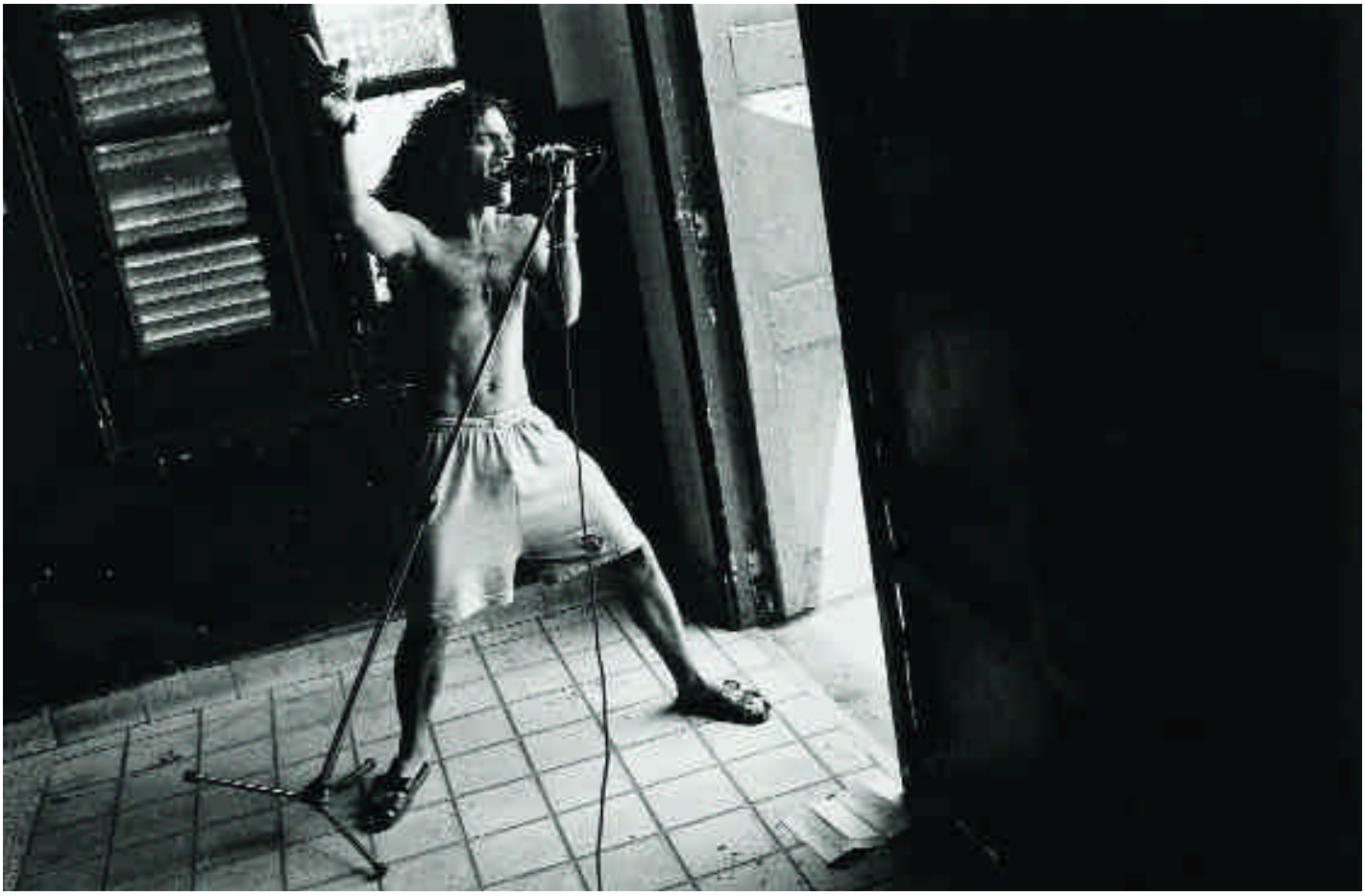

Photos © Grégoire Korganow/Métis, Paris

A Cuban rock singer rehearses in Havana. Young Cubans, like their elders, love music and dance. Fiesta time means salsa, timba, guaracha, mambo, rumba, rock, techno, son, guajira, trova, danzón, bolero, and cha-cha-cha.

A young couple and their child.

A CRUCIAL ENCOUNTER

Unesco/Ines Forbes

Federico Mayor

Genetic tests and treatments must not be allowed to create new forms of discrimination—between those who, for whatever reason, can or want to take advantage of them, and those who cannot, mostly for lack of money

If a scientific discovery can form the basis of a technology, then it is highly probable that the technology will eventually be applied. Today this lesson of history is causing anxiety among politicians,scientists and public opinion concerned about the current far-reaching developments in biotechnologies.

It is now possible to penetrate to the very essence of living things as a result of spectacular scientific advances that are gradually revealing the innermost mechanisms of life.The technologies based on this field of knowledge offer humanity for the first time astonishing powers to revolutionize the process of creating and developing human beings and, ultimately, the human species. Technically speaking, these breakthroughs could lead to the revival,in even more effective guises,of eugenic practices we hoped had been buried forever. Fortunately, this nightmare scenario seems highly unlikely.

But history also shows that new technologies are rarely applied without a framework of rules and procedures designed to ensure that they are beneficially used. Human progress has always been driven by the winds of freedom, including freedom of enquiry and initiative, but human beings have always tried to head in the right direction and to respect certain limits. The biologists have done their work: they have sown the seeds of vast possibilities. Now it is up to society to make sure that only the benefits are harvested.The biotechnology revolution beckons humanity to a crucial encounter between science and ethics.

Where human reproduction is concerned, as with technology in general, we must be guided by respect for three basic and interdependent principles—dignity, freedom and solidarity.

For human dignity to be respected, each person must be regarded as unique. This position has far-reaching consequences for human procreation. First of all, it rules out cloning as a means of reproduction because this technique, which is almost upon us, involves genetically "duplicating" an existing person. More generally, predetermining the basic characteristics of a future person, notably trying to enhance their future physical or mental capacities, violates the very essence of human individuality. This kind of engineering would end up by depriving individuals of that which is theirs alone—the mysterious processes whereby their unique genetic heritage emerges and interacts in its own unique way with their environment.

Advances in prenatal scanning and testing techniques may confront parents with grave new decisions. The danger is that various kinds of pressures or even regulations will develop which only allow "genetically correct" people to be born. This would be totally unacceptable. No authority—be it political, social or economic—should be able to enact such a "genetic order", still less impose it.

So increasing emphasis must be laid on solidarity. Genetic tests and treatments must not be allowed to create new forms of discrimination—between those who, for whatever reason, can or want to take advantage of them,and those who cannot, mostly for lack of money.

The risk of uncontrolled, unmonitored genetic engineering increasingly looms over us. But we are starting to see the emergence of a new "responsible" form of genetic engineering in which the power of science is subjected to the power of ethics—an ethics that benefits everyone, not just a few, and looks towards future generations, not just short-term interests. ■

MILLENNIUM BUGS WITH A DEADLY BITE

◆ Robert Matthews

Through an arrogant or ignorant disregard for ecological complexities, ceaseless human encroachment on nature can unleash a terrible new threat of killer diseases carried by microbes that have long lain undisturbed

At first, the men seemed to be suffering from nothing more than a case of influenza: a bad headache, aching joints, a fever. But it quickly became clear that dozens of Durba's gold miners in the Democratic Republic of the Congo were in the grip of something far worse. Somehow, late last year, they had come into contact with a terrifying infectious agent that was attacking all their internal organs, causing them to bleed uncontrollably.

Over the following months, over 60 miners died from the mystery disease, their limp bodies covered with blotches and oozing blood even after death. Local doctors had never seen anything like it. At first, not even seasoned experts from the World Health Organization (WHO) could say for sure what was causing such appalling deaths.

But many harboured the same suspicion: that the miners had become infected by a so-called emerging virus: a tiny packet of genes that had lain undisturbed in its natural lair for years, perhaps millennia—until humankind blundered into it.

The suspicion was that the mystery disease was caused by a so-called filovirus, a thread-like virus whose devastating effect on the human body had first been discovered 30 years ago.

In 1967, dozens of people working in laboratories in Germany and Yugoslavia fell ill with eerily similar symptoms. Seven died, and many of the survivors suffered long-term effects ranging from impotence to insanity. The source of the infection was traced to a batch of vervet monkeys imported from Uganda, many of which had died during transportation.

The monkeys were found to be carrying a filovirus, which was duly named after one of the German towns where the first cases emerged: Marburg. To this day, no cure has been found. If the victim's immune system cannot fight it, it's over—a fate that awaits over 50 per cent of those who become infected.

Deadly pathogens—do not disturb

In May, WHO confirmed everyone's fears: tests on blood samples taken from the miners showed that they had indeed been infected with Marburg virus. Soon reports began to emerge of an outbreak of the same disease among soldiers in Zimbabwe. Thousands of troops had been crossing into DRC to support President Laurent Désiré Kabila as he tried to put down a rebel uprising.

Fortunately, blood tests on three soldiers suspected of carrying Marburg turned out to be negative, and by early summer the outbreak in Durba was over. The virus had vanished again, back into its jungle haunts—but precisely where, no one knows. Somewhere out there, a creature—a species of bat, perhaps, or a rodent—is unwittingly acting as a refuge for Marburg.

What is clear is that the more incursions into virgin territory humankind makes, the greater the risk of another encounter with Marburg—or perhaps something worse. After decades of insouciant use and abuse of the world's natural resources, from the primordial forests of equatorial Africa to the oceans, the threat of disturbing new and deadly pathogens now has to be taken seriously.

The warning signs have long been clear. As long ago as 1485, reports emerged of a disease known as the Sweating Sickness, in which victims progressed from sudden sweating to prostration and death in just 24 hours. It struck four more times before vanishing again in 1551. But the country affected was not some isolated jungle community in the tropics. The Sweating Sickness wreaked its havoc in England, ultimately claiming the lives of around 20,000 people—over 0.5 per cent of the total population.

Recent research has linked the emergence of Sweating Sickness to a strikingly

Deforestation in Madagascar. The emergence of several lethal viruses has been linked to the destruction of woodland.

© Paul Harrison/Still Pictures, London

◆ Science Correspondent of *the Sunday Telegraph*, London

© Denis Farrell-AP/Boomerang

A microbiologist carries out culture tests at South Africa's National Institute for Virology in Johannesburg in May 1999. Results showed that the Marburg virus was responsible for the death of over 60 people in Durba (Democratic Republic of the Congo).

modern phenomenon: deforestation. The timing and spread of the outbreak ties in with the mass destruction of woodland in Shropshire, on the western borders of England. The suspicion is that forest workers somehow allowed the virus responsible for the disease to spread beyond the creature that had acted as its host for countless generations, bringing it into contact with populations big enough to sustain an epidemic.

This is a scenario that has been played out again and again in our own times. In Argentina after the Second World War, vast areas of the Pampas were cleared with herbicide to make way for new crops. In the process, the natural balance between a species of field mouse and its predators was disturbed, and the numbers of the former soared—as did those of itinerant farm-workers. By the early 1950s, people began to fall prey to fevers, vomiting and headache. Some went on to suffer massive haemorrhaging, and died hideous deaths. The cause was eventually traced to a previously unknown virus, Junin, carried by the field mice.

The same story was repeated in Bolivia, where farmers keen to grow maize hacked down stretches of jungle near the Machupo River. Sure enough, the reports of strange, horrible deaths among farm-workers started to roll in, and their cause was traced to another haemorrhagic virus, duly named Machupo, again carried by field mice.

And early in 1999, evidence emerged to link campaigns of deforestation to the rise of the most notorious emergent disease of them all: Aids. In February, an international team of researchers published a paper in the journal *Nature* that points to the chimpanzee *Pan troglodytes troglodytes* as the natural host of HIV-1, the lethal virus that now infects over 30 million people worldwide.

In February, an international team of researchers published a paper in the journal *Nature* that points to the chimpanzee *Pan troglodytes troglodytes* as the natural host of HIV-1, the lethal virus that now infects over 30 million people worldwide.

Killed for their meat by hunters hired by timber companies, these apes are butchered in their thousands each year in conditions that are ripe for the transmission of viruses. Finding its way into cities via infected meat for restaurants and via the hunters themselves, HIV-1 went on to be sexually transmitted throughout the world, according to this latest research. To date, over 12 million people have died from Aids, 80 per cent of them in sub-Saharan Africa.

The dangers of an arrogant disregard for the complexities of ecosystems may take other forms than the destruction of virgin territory. It was, for example, attempts at reforestation in north-eastern America during the 19th century that led to the recent emergence of Lyme Disease, a potentially fatal bacterial infection affecting the joints, heart and brain, passed to humans via ticks carried by deer.

The deer came into contact with humans following moves to rectify the impact of deforestation caused by intensive farming. Local governments launched preservation and reforestation programmes, and created a landscape attractive to both humans, deer—and *Ixodes scapularis*, a deer-borne tick which carries *Borrelia* ▶

burgdorferi, the bacterium responsible for Lyme Disease.

With few natural predators in the newly-formed ecosystem, the deer flourished, and increasingly came into contact with humans, who were also flocking to the area, entranced by its apparently "natural" beauty. By the mid-1970s the first cases of the tick-borne disease were being noted among the inhabitants of Old Lyme, Connecticut.

The same story has since been played out in Europe, Asia and Australasia, and tens of thousands of cases of Lyme Disease are reported worldwide each year.

The return of TB, diphtheria, cholera and malaria

The return of a number of old killer diseases once thought vanquished also serves to warn of the dangers of hubris and complacency. Tuberculosis, all but eliminated in the West following the advent of decent housing and powerful drugs, has been on the rise again since the mid-1980s with over three million killed each year worldwide. Many experts blame sloppy use of antibiotics by Western doctors, which has allowed mutant TB bacteria to survive and create resistant strains. In developing countries, the Aids epidemic—which has left tens of millions with no disease-fighting immune system—caused the number of TB cases to triple by the early 1990s.

Outbreaks of diphtheria, another bacterial disease of the lungs that especially targets young children, were virtually unknown in the last days of the former Soviet Union. Around 40,000 cases were reported in 1998, primarily among the poor and homeless who flocked to major cities following the collapse of the union, whose health-care systems had collapsed with it.

In the early 1990s, cholera returned to haunt the Americas after a century of absence. Experts suspect this deadly bacterial gut disease was imported from Asia in water flushed from the ballast tanks of ships. At the turn of the century, virtually no cases were known in the Americas; today, around 60,000 cases are being reported each year. Globalization of commerce has, it seems, given us all too ready access to rather more than just exotic produce from faraway lands.

Yet of all the resurgent diseases, it is malaria that provides the most poignant example of where ecological effects have shattered the dream of complete eradication. The original optimism stemmed from the introduction of DDT into developing nations, to kill off the mosquitoes that carry the parasite responsible for malaria.

© Hector Mata/Gamma, Paris

A cholera epidemic struck Peru in 1991. Above, family members at the graveside of a victim in Chimbote, north of Lima.

Within ten years of its introduction after the Second World War, DDT had saved an estimated 5 million lives. In many countries, the impact was truly astonishing. In 1948 Sri Lanka had 2.8 million cases of malaria; by 1963, following the introduction of DDT, the number had fallen to just 17.

'If coastal protection systems are not strengthened, a 50-centimetre rise in sea-level by 2100 would place 80 million people in danger of being flooded more than once a year, compared to 46 million people under present conditions. The displacement of so many people to already densely-populated delta areas and on populous island states would be bound to result in outbreaks of diseases like diphtheria and diarrhoea'

But by the late 1950s, evidence had emerged suggesting that DDT's persistence in the soil and ability to creep up the food chain was having a deadly effect on some forms of wildlife.

Although some experts are beginning to dispute the evidence—and especially its relevance to the Third World—DDT now faces a worldwide ban. The mosquitoes have, however, gone from strength to strength. In Sri Lanka, the number of malaria cases rose from 17 back to 2.5 million within just five years of abandoning DDT. Worldwide, a staggering 400 million cases are being reported each year, along with almost two million deaths—90 per cent of which take place in Africa.

In March 1999, Dr Gro Harlem Brundtland, the Director-General of WHO, singled out malaria as an example of a pandemic killer likely to benefit from another environmental threat: global warming, caused by man-made pollution trapping more of the sun's heat in the atmosphere.

Dr Brundtland pointed out that malaria is now being reported in locations at higher altitudes than in previous years, such as the mountain plateaus of Kenya. While admitting that there are likely to be various explanations for the change, Dr Brundtland believes that one possibility is global warming.

Rising sea-levels, caused largely by the thermal expansion of water driven by global warming, pose another threat, according to Dr Brundtland. "If coastal protection systems are not strengthened, a 50-centimetre rise in sea-level by 2100 would place 80 million people in danger of being flooded more than once a year, compared to 46 million people under present climate and sea-level conditions," she says. "The displacement of so many people to already densely-populated delta areas and on populous island states would be bound to result in outbreaks of diseases like diphtheria and diarrhoea, just to mention the most obvious ones. The rising water table along the coast could also encourage the release of patho-

gens into septic systems and waterways."

But while the effects of global warming on sea levels have yet to make themselves clear, fears are already growing that the sea may pose a more immediate—and insidious—threat to health.

It stems from humankind's insouciant use of the world's oceans as gigantic sewers. A 1993 World Bank report estimated that around 30 per cent of humans have no other waste disposal system than streams, rivers—and the sea.

For years a case of "out of sight, out of mind", the dumping of so much waste in coastal waters is now starting to have an impact on health. Viruses from human diseases like polio and hepatitis have started to be found in shellfish, while toxic algal blooms—vast colonies of simple, pathogen-packed organisms that thrive on waste-derived nutrient—are becoming increasingly frequent along coastlines.

It is now becoming clear that the sea is acting like a gigantic cold-store for potentially deadly microbes like rotavirus, responsible for severe diarrhoea, and poliovirus—and sometimes they emerge to cause havoc on the mainland. In December 1992, thousands of people in Bangladesh fell victim to cholera, following an upwelling of bacteria-laden ocean water off the southern coast.

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The female *Anopheles* mosquito carries the malaria parasite and injects it into the human bloodstream.

From deforestation to overpopulation, mass migrations to global transport, atmospheric to oceanic pollution: the reasons for which new and resurgent diseases can and do rise up to threaten humanity are legion. But lessons are being learned. Some are very basic and relatively simple to implement, such as the one-time-only use of hypodermic needles. Others are equally obvious but far harder to achieve, such as making safe sex advice effective among those at risk from sexually-transmitted diseases like Aids.

Early detection and rapid control measures

As with any threat, eternal vigilance for new disease outbreaks is now being seen as crucial. In its report on the outbreak of plague in India in August 1994, the All-India Institute of Medical Sciences warned that such re-emerging infectious diseases are a growing threat world-wide. "Early detection and rapid implementation of effective control measures are essential," the report's authors said, and duly called for the setting up of national surveillance centres to act as early-warning systems.

But the key message now emerging from many of the recent outbreaks is a blunt one: we must become far more thoughtful in our dealings with the environment and its delicate ecosystems. Long dismissed by some as just a pious desideratum, the cost of ignoring this simple message could be nothing less than the needless death of millions. ■

WERE THE TEN PLAGUES OF EGYPT TRIGGERED BY AN ECOLOGICAL DISASTER?

While concern mounts over the risk of new diseases emerging from the seas and rivers, one leading expert believes that they may hold the key to an ancient catastrophe: the Ten Plagues that struck Egypt almost 3,300 years ago.

According to the Book of Exodus in the Old Testament, Egypt was punished by God with a series of terrible plagues after refusing to release Moses and his followers from slavery. Sceptics have long rejected this ancient story as a myth, but according to Dr John Marr, former chief epidemiologist for New York City, the story may well be based on fact. His research suggests that the biblical plagues may have been the result of an ecological disaster triggered by algal blooms, whose disease-spreading effect is now causing growing concern among scientists.

The first of the Ten Plagues, in which the Nile reportedly turned blood-red and undrinkable, is strikingly reminiscent of the toxic "red tides" still caused by algae known as dinoflagellates in some parts of the world today.

The resulting ecological imbalance caused by the death of fish could, says Dr Marr, have led to the second and fourth Plagues, of toads and their prey, flies. He also argues that a specific type of fly could explain the third and fifth plagues, of lice and livestock sickness: the midge-like creature Culicoides creates a louse-like irritation and transmits deadly viruses that kill animals in hours.

Dr Marr says that another insect–the stable fly, which causes the bacterial disease glanders–is a good candidate for the sixth plague, of boils on man and beast.

While the seventh and eighth plagues–hail storms and locusts–need little explanation, the ninth plague, in which darkness fell for three days, may have been due to an outbreak of Rift Valley Fever, known to cause temporary blindness.

But Dr Marr's most ingenious explanation concerns the final and most dramatic of all the Plagues: the Death of the First Born. He suggests it is a direct result of the Egyptians' attempts to deal with the previous disasters. Hastily gathering what little crops had survived the hail and locusts, they may have stored the damp grain in silos. Under such conditions, the grain would go mouldy, and become coated with deadly mycotoxins. By biblical tradition, the eldest child would have received double rations of contaminated grain–leading to widespread deaths among the first-born.

If Dr Marr is correct–and other experts say the chain of events is plausible–the legend of the Plagues of Egypt may be a timely warning of how an ecological disaster can trigger devastating diseases that threaten civilization. ■

SCHOOLING IN TIMES OF STRIFE

◆ Mark Richmond

From 'school-in-a-box' packages to counselling for children traumatized by fear and bereavement, education is playing a pivotal role in emergency relief operations

When people are robbed of their homes, land and possessions by violent conflict, time and time again they ask for education. Over the past decade, from Somalia, Sudan and Rwanda to Bosnia and Kosovo, the United Nations has been confronted in all-too-close succession by what are commonly referred to as complex political emergencies. These crises involving violent internal conflicts based on nationalist, local, ethnic and religious factors, lead to huge internal and external population displacements,the looting and destruction of infrastructure,the targeting of civilian populations and the collapse of essential basic services. Their spread, particularly in Africa, owes much to the breakdown of the post-colonial settlements of the 1950s and 1960s held in place somewhat artificially by superpower rivalries during the Cold War and associated ideological and geopolitical alignments.

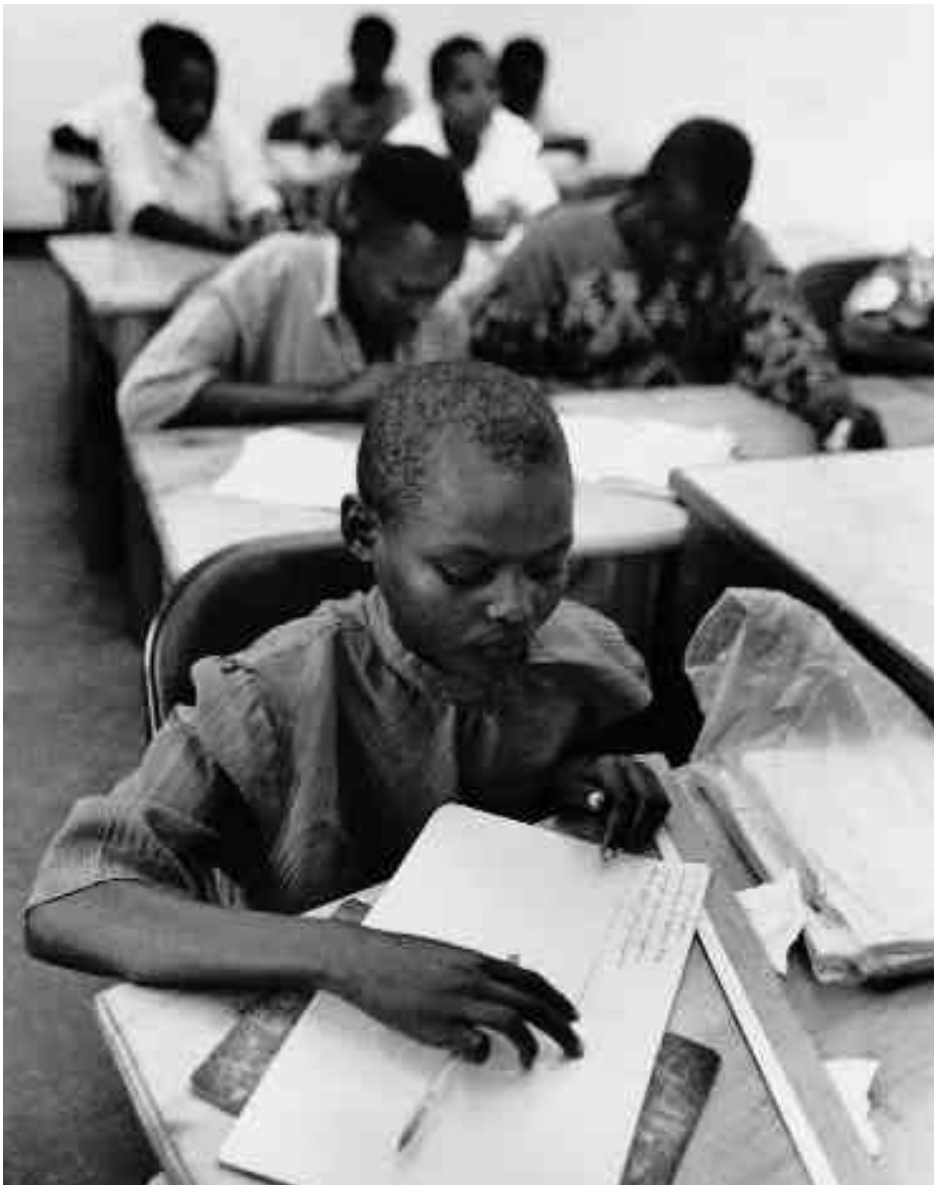
Warlords and bandits

At the root of many such emergencies are escalating economic problems that have stimulated fierce inter-group struggles over access to and control over resources. In some cases, such as Somalia, violent internal conflicts have led to the collapse of the state,leaving ordinary citizens at the mercy of warlords and bandits.

Assuring survival is of course the first task of any humanitarian operation.This means providing basic services such as food, water,security, health care and shelter. But along with this,there is a steadily growing recognition of the need to introduce education in the early stages of humanitarian assistance, whether it be for refugees, internally displaced persons or war-affected populations. This notion, of relatively recent origin, draws upon several justifications. One is the right to education itself, a right which is not forfeited because of war or displacement. This right is enshrined in the Convention on the Rights of the Child (1989) and was at the heart of the Jomtien Conference (1990) on Education for All. These developments have helped to generate an international policy context conducive to the recognition not only of everyone's right to education but also of the obligation of all social actors—agencies, donors and NGOs—to translate that right into practice.

At a practical level, educators and psychologists emphasize the importance for children's development of minimizing the period during which learning is disrupted. Organized recreational and educational activities bring routine back into children's lives

Schoolchildren in Kibondo, a resettlement village in the Kigali region (Rwanda). Some 230,000 Rwandan children do not have places in school.



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◆ Chief of educational services co-ordination for the United Nations Interim Administration Mission in Kosovo. Former head of UNESCO's Programme for Education for Emergencies and Reconstruction in Nairobi.

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Wooden boards carved with Koranic verses are the only teaching materials available in Bardera camp for refugees and displaced persons (Somalia).

and help them to maintain a connection to their own socio-cultural environment. Whether formal or non-formal, schooling can re-establish a sense of normalcy in an abnormal situation, and offer alienated youth an alternative to militias, crime, delinquency or drugs. In emergency situations, schools can be one of the most valuable channels for communicating messages about the environment, nutrition, mine awareness, cholera and Aids prevention. They are also places where themes such as human rights, peace and reconciliation can be broached. Such values constitute the underpinning of any subsequent programme of national reconstruction. Moreover, schools can often serve as centres for relief and rehabilitation programmes for the community at large. Education can offer opportunities for paid employment and provide adults with a chance to play a role in their new, albeit temporary, surroundings. Last but not least, education symbolizes a commitment to the future, something more valuable than ever in the aftermath of violent conflict.

While each crisis calls for a specific type of rapid educational response, the tragedies of the past decade have given international agencies sufficient experience to draw up guidelines for conducting operations. Because it is impossible to get a schooling system into gear overnight, a phased approach enabling education to be introduced in the early stages of humanitarian assistance has become standard practice in emergency situations.

After the collection of relevant educational data (number of children, availability of teachers, etc.), a first phase brings children together for recreation activities—games, songs, listening to stories, and perhaps some simple lessons. During a second phase, non-formal schooling is established on a systematic basis, often using a Teacher Emergency Package (TEP), which was first conceived by UNESCO for use in Somalia and has now been translated into several languages and culturally adapted to suit different populations.

Education symbolizes a commitment to the future, something more valuable than ever in the aftermath of violent conflict

Although the concept is evolving, this "school-in-a-box" or "mobile classroom" is designed for approximately 80 refugee children of primary school age and aims to teach functional literacy and numeracy, rather than a formal graded curriculum with exams. A box typically includes slates, chalk, exercise books and pencils for students and a teacher's bag containing cloth charts (alphabet, number and multiplication), a guide outlining teaching methods, an attendance book and scrabble sets of small wooden blocks so that teachers can create language and number games. Designed for a six-month learning span, TEPs act as a bridge between no schooling at all and a return to some form of regular schooling.

After this interim period, the third phase of near-normal schooling generally begins, based on curricula and textbooks (when available) from the country of origin. Another important aspect of emergency education programmes is the training of teachers to recognize symptoms of trauma in children who all too often arrive in their new makeshift schools after witnessing appalling levels of horror and violence. Psycho-social support programmes include counselling to help children come to terms with loss, bereavement, displacement and fear.

This entire strategy is geared towards education for repatriation. The concept, first clearly articulated during the experience of providing schooling to Mozambican refugees in Malawi in the 1980s, has gained growing acceptance in the 1990s, partly because host countries, which are generally too poor to absorb a large foreign ▶

influx, need to be reassured that refugees will not settle there on a permanent basis. Hence the importance of using the mother tongue as the language of instruction, of teaching the curriculum of the country of origin (provided it has not been a source of oppression to the displaced population), and relying largely or wholly upon refugee teachers to staff the schools.

The notion that education is geared towards repatriation adds a long-term dimension to the concept of emergency. It implies that planners think along a relief-to-development continuum that fits in with the development policy being designed for a country or sub-region. Unfortunately, this is not a linear process: countries such as Angola and Sudan have slipped in and out of war over recent decades, hampering efforts at national reconstruction.

Community initiatives

Broadly speaking, emergencies can be conceived as opportunities for educational transformation. This is why the planning of emergency education, especially when the task of rebuilding educational systems begins, must integrate an approach that combines top-down technical planning, which tends to characterize most postwar systems, with bottom-up community-oriented development initiatives. In emergency situations, parents,elders and professionals often play an important role in the setting-up and running of schools, often developing a sense of ownership towards them.

They should continue to have a voice in the planning of education after resettling in their country of origin. But traditional avenues through which financial support is channelled for reconstruction tend to exclude civil society. Donors go through the central state—often a highly weakened state with poor administrative and management capacity—to deliver funds, a method that tends to undermine more participatory approaches to educational planning. The international community also needs to take stock of recent interventions and assess them in more thorough and critical ways. The turnover of crises in the past decade has been such that sufficient time has not been devoted to actually learning from the past. Rather than jump onto the next emergency, key practitioners involved in large-scale operations should be given the opportunity to take stock so that institutional knowledge can be accumulated and lessons learnt can inform future practices. Such reflection could also serve to put education higher up on the agenda when defining budgets and priorities for complex emergencies. ■

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The scene in Neprostino camp near Skopje (Macedonia) on April 15 1999, the third day at school for some 500 children who had fled from Kosovo.

EMERGENCY EDUCATION: THE LESSONS AND CHALLENGES OF KOSOVO

The Kosovo crisis will be a major source of experience and reflection regarding emergency education. The refugee situation in Albania and Macedonia witnessed the application of many lessons and practices derived from other emergencies: for example, the inclusion of education within the early stages of refugee assistance operations, the attempt to provide demarcated spaces within camps for recreational and educational activities, the priority focus on primary schooling, the provision of educational kits, the attention given to psycho-social needs, the explicit adoption of a phased approach, and the use of refugee teachers in the camps **(see article)**.

Although international agencies and NGOs clicked into action when the crisis broke out, the provision of education was not without problems. In Macedonia, there was rapid turnover in the camps, with people often being transferred to other countries, making it very difficult to plan or to have a stable school population. Also, many Kosovar refugees were living with families in predominantly ethnic Albanian communities. This naturally placed a heavy burden on local school systems and required both the governmental authorities and external agencies to divide their attention between camp-based and community-based programmes.

The burden of accommodating the influx of refugees, particularly as it placed heavy pressures on each country's educational infrastructure, facilities and resources, led both Albania and Macedonia to request substantial amounts of international assistance for their own educational systems. The limited and rapidly depleted capacity of the ministries of education contrasted sharply with the comparatively well-resourced situation of many external agencies and NGOs, a situation found in many humanitarian operations. Little attention is given to the collateral damage caused to resource-starved educational systems in host countries.

With the war over and the refugees returning home comes the task of rebuilding the whole educational system in Kosovo, the next logical phase of the emergency operation. According to a preliminary UNICEF survey of 394 schools, 43 per cent of them were completely destroyed or severely damaged. But the task is an acutely sensitive one. Prior to the attack on the ethnic Albanian population in March 1999, the official educational system had been run by Serbs while a parallel system for ethnic Albanian children had operated clandestinely for 10 years. Kosovar Albanians boycotted the formal system because they could no longer accept the ethno-ideological bias they detected within the curriculum.

Technically, the United Nations Interim Administration Mission in Kosovo (UNMIK) has control over these matters and it is determined to pursue an even-handed approach which respects the interests of both Serbs and ethnic Albanians in Kosovo. But establishing and maintaining a unified system will be far from easy. The UN peacekeeping force (KFOR) will be put to the test in protecting Serb children in integrated schools. As of August 1999, the question of who will pay teachers had not been resolved. Schools need to be repaired and equipped with furniture and toilets, children have to be provided with textbooks and other basic materials and psychosocial services have to be made available. The certification of children's learning in the parallel system has to be agreed upon. In the longer run, the greatest challenge will be to restore quality to the system: for example, formal teacher training and regular professional development for Kosovar Albanian teachers was virtually impossible in the 1990s. The situation that exists today is a golden opportunity for Kosovar education to broaden its vision and modernize its teaching and learning practices. ■

FOCUS

Bioethics: the lure of the perfect child

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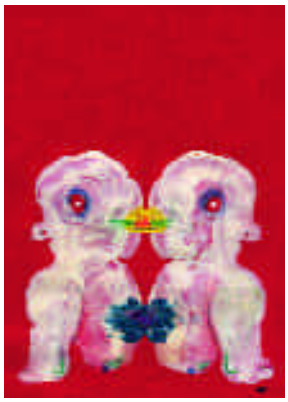


© André Francois

A new age unfolds as scientists put the final touches on a map of the human genome: our some 100,000 genes. Among the wealth of potential benefits, future parents will not only be able to screen foetuses for "defects", but also may one day be able to correct a predisposition for diseases like breast cancer or even "enhance" certain behavioural or physical traits deemed desirable.

Why shouldn't parents make the most of technology to create the "child of their dreams", beaming with health and potential? Dangerous fantasy lurks in this sunny hope, warn voices from bioethical and scientific communities, feminists and disabled rights groups. Will genetics spawn new forms of eugenics? An emotionally charged word laden with historical connotations, eugenics defies easy definition. Yet the word's very force demands reflection on the dark side of attempts to genetically "improve" the human species.

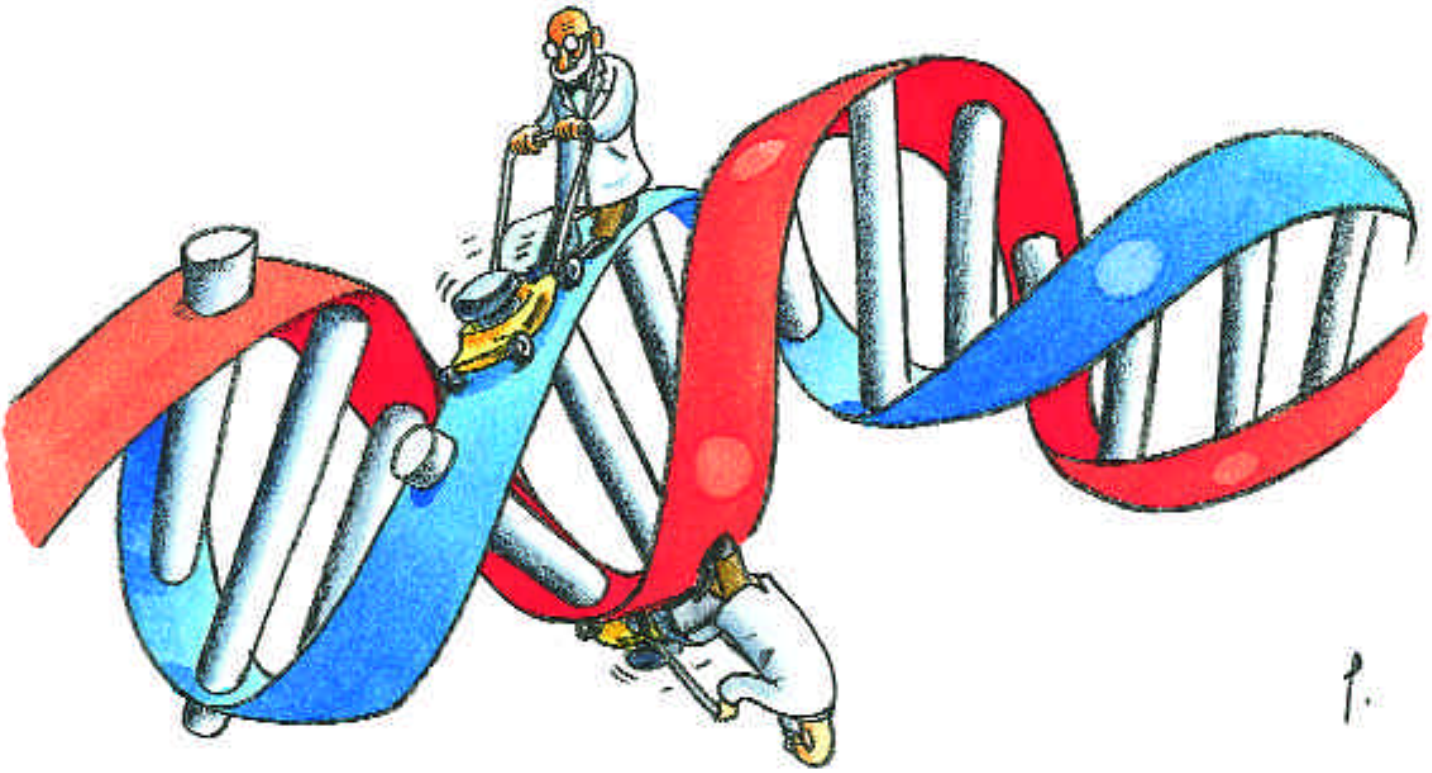
The articles in this section illustrate the ways in which societal pressures can exert a coercive force on reproductive decision-making. In the United States, for example, we see commercial interests driving parents' conceptions of their children. Population pressures in China fire debate over a controversial law to limit the birth of handicapped people, while cultural discrimination against girls drives parents in India to extremes to produce sons.

The apprehensions surrounding human cloning are clearly seen in Dolly's birthplace, the United Kingdom. Meanwhile the shadow of the past leads Germany to tread softly in the field of biotechnology. Finally, we take a broad look at the ethical issues raised by current disparities in international access to the fruits of genetic research.

Uncharted terrain on tomorrow's genetic map

◆ Sophie Boukhari and Amy Otchet

In the post-genomic age, medical science's good intentions could lead us to the frontier of new forms of eugenics



In about three years, we should have the keys to decode our biological "ego". Through the Human Genome Project, thousands of researchers from about 50 countries are putting the final touches to a map identifying all of our roughly 100,000 genes. This information will open the way to developing a large number of innovative treatments and techniques to cure and prevent disease.

At the beginning of this "genetic age", we can expect an extensive battery of DNA tests which prospective parents will use to gain an extraordinary picture of their embryo's genetic make-up. These tests may be used in utero to reassure parents as to the health of their child-to-be. On the other hand, signs of disease or handicap might also lead to the decision to abort. This same battery of DNA tests will also be used for preimplantation diagnosis, in which prospective parents sift through and then select in vitro ("test tube") a fertilized egg (or eggs) before implantation in a woman's womb. Both of these screening approaches are part of "genetic counselling", a term used to describe a very sensitive process in which people basically decide what kinds of individuals are born. We already see this selection process at work with health policies in some countries encouraging women to take prenatal tests for Down's Syndrome.

In the next phase of genetic research, geneticists will develop a range of treatments for genetic disorders, including gene therapy, now just in their very early stages. This research is raising wild hopes, from the ability to cure certain cancers to combating the 4,000 to 5,000 genetic illnesses identified so far. Some geneticists are already dreaming of germ-line therapy in which genetic changes are passed along to future generations. Indeed scientists like American Lee Silver foresee the rise of a new discipline: "reprogenetics" which will combine cloning and genetic engineering techniques to one day "enhance" in vitro embryos (pp. 27-28). Enhancement could take a variety of forms: from improving resistance to disease to modifying behavioural or physical traits with a view to producing the "child of parents' dreams".

◆ UNESCO Courier journalists

For now, these scenarios are not only technically impossible but legally prohibited: reproductive cloning of humans (pp. 32-33) and germ-line therapy are forbidden. But they are warning signs for those who fear that medicine will be used as a way of selecting and controlling "good" and "bad" genes. "We are on the verge of a new eugenic age," warn the serried ranks of philosophers, priests, human rights campaigners and anti-abortion groups. Their cry has sparked a major bioethical debate on two fronts. The first revolves around the very definition of eugenics (see glossary), an emotionally charged word closely associated with the horrors of Nazism (pp. 22-23). Secondly, will advances in genetics give rise to new forms of eugenics?

Asian countries (pp. 30-31) and Arab Gulf states already have laws denying the disabled the right to be born. According to Noëlle Lenoir, former president of UNESCO's International Bioethics Committee (IBC), "in societies already plagued by discrimination, genetics could become another instrument of exclusion." Can any society claim that it is untainted by this social ill? Certainly not those which deem girls inferior (p. 29).

What is normality?

The debate over eugenics reminds us that there is no such thing as a "perfect" baby. The human gene pool cannot be "cleaned" up because, as scientists point out, new genetic anomalies develop with each generation. Besides, genetic engineering is an inherently risky endeavour because it is impossible to predict which genes our descendants may need in the future.

A host of fundamental ethical questions also arise. Tests to detect late onset diseases raise the problem of defining a life worth living. A genetic disease like "Huntington's chorea usually develops between the ages of 38 and 45," says French geneticist and bioethicist Axel Kahn. "Yet think of all the great artists and musicians who died before reaching 40. We see here the difficulty in saying that a life isn't worth living if it ends or suddenly deteriorates at a certain age."

Another thorny question lies in defining "normality". Imagine the discrimination directed towards handicapped people in a society accustomed to the idea of eliminating genetic "defects"? Many bioethicists such as IBC president Ryuichi Ida also see grave dangers potentially arising from the "genetic enhancement" of embryos. To begin with, new inequalities would develop between those who could afford such "treatment" and those lacking access to it (pp. 27-28).

We must also ask whether parents have the right to "design" the child of their dreams? "A child is a separate and complete individual who cannot be reduced to the expectations of his or her parents," says Kahn. "Being a parent is supposed to be about loving a child as he or she is. Parenting is not about requiring a child to be as you would like him or her to be. In this respect, children are in danger."

Yet brandishing the spectre of eugenics is simplistic and dangerous, insist many scientists, biotechnology executives, bioethicists, and feminists. Furthermore, anti-abortion groups might manipulate the debate to curtail women's hard-won rights to control their own fertility (pp. 22-23).

There may also be a positive side to "laissez faire" or "utopian" eugenics—terms which are sparking a flurry of discussion in affluent Western countries. Many bioethicists and scientists maintain that these new forms of eugenics simply describe the choices individuals—not the state or the community—will be able to make about the kind of children they want to bring into the world. But how will commercial pressures and interests drive these decisions? "With sufficient advertising, the biotechnology market will make parents feel guilty if they don't consume" all the genetic tests and services available, says Lori Andrews, an American legal expert in the field (pp. 28-29).

As geneticists point out, science and medicine have always advanced by violating social taboos. Scientists should not be penalized for the ways in which society uses their discoveries. The ethical path lies in giving people time to reflect on the consequences of scientific progress.

"Individuals everywhere are faced with more and more ethical dilemmas," says Lenoir. "In some ways, it's easier when you live in an authoritarian or religious society. The rules are laid out before you (pp. 24-*26). But in culturally diverse and secular societies, where people have access to information and can stand up for their rights, it's much harder to set guidelines. This is what gave birth to bioethics.*" ■

Give me the strength and the will to broaden my knowledge. Steer me from the idea that all is within my reach.

Maimonides, Rabbi and doctor (1135-1204)

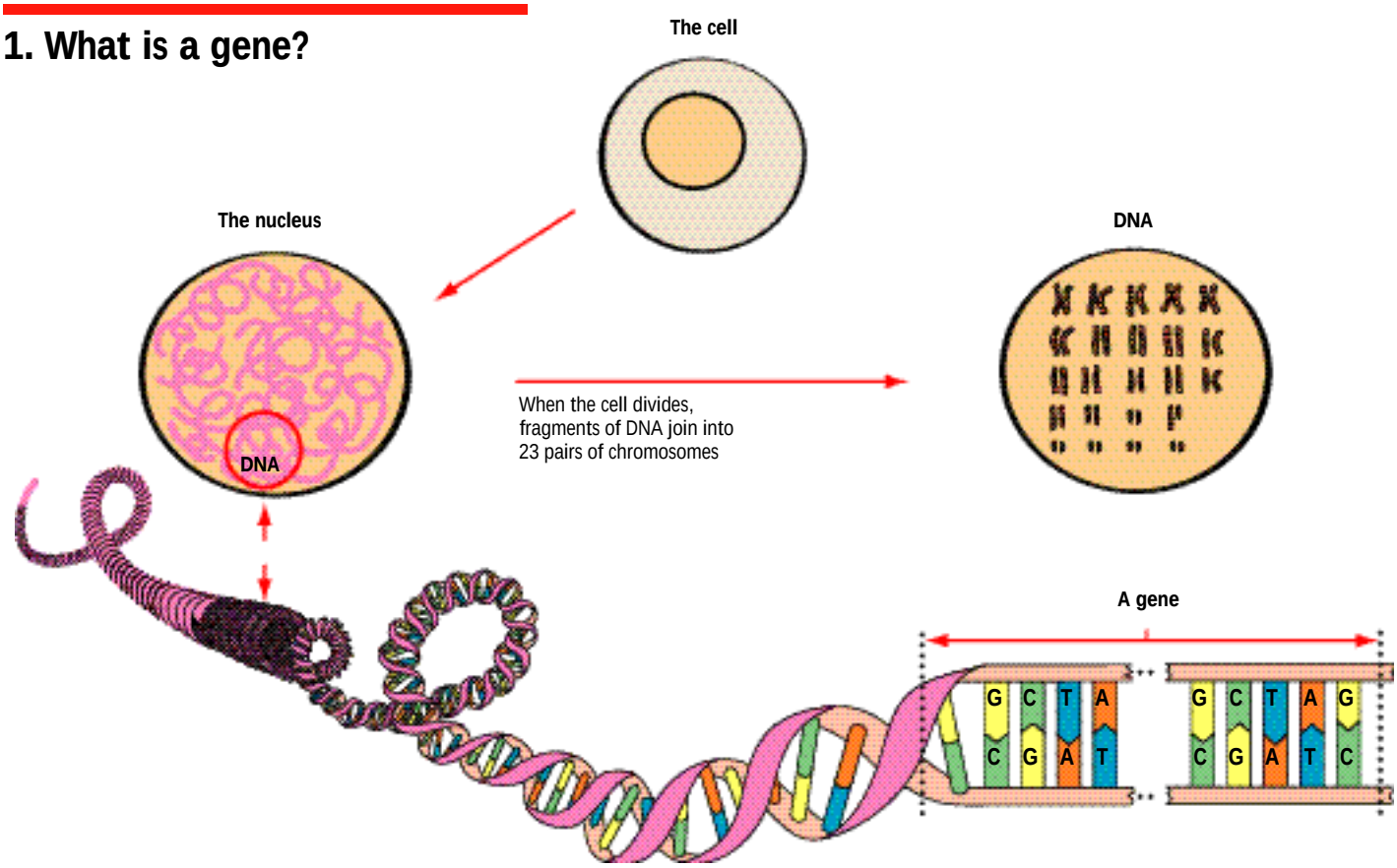
Glossary

DNA: deoxyribonucleic acid, the carrier of genetic information (pages 20-21).
ES cells: embryonic stem cells, mostly **totipotent**, i.e. capable of providing the genetic programme required to direct the development of an entire individual.
Germ cell: reproductive cell (sperm or egg cells), changes in which are passed down through generations.
Somatic cell: non-germ cell, known as an "adult" cell.
Chromosome: rod-like structure made of DNA, visible when a cell is divided (see pages 20-21).
Clones: genetically identical living things, obtained by asexual reproduction.
Eugenics: a term invented by the British scientist Francis Galton from the Greek words "eu" (good) and "genos" (birth, race). The study of how to improve human genetic heritage (see pages 22-23).
Gene: a segment of DNA which, alone or in combination with others, determines creation of a trait. An organism's total genetic material is its **genome** (see pages 20-21).
Recessive gene: one which does not produce the character to which it is linked unless it exists on both the male and female chromosomes in the pair. A **dominant gene**, on the other hand, produces its characters by dominating the different gene carried by the other chromosome in the pair.
Genetic disease: several thousands of these have been identified. Some are **mono-genic**, i.e. a single gene is responsible for the disease. Others are **multi-genic**, with several genes involved.
Gene therapy: treatment of genetic diseases by introducing genetic material into the patient's genes (see pages 20-21). ■

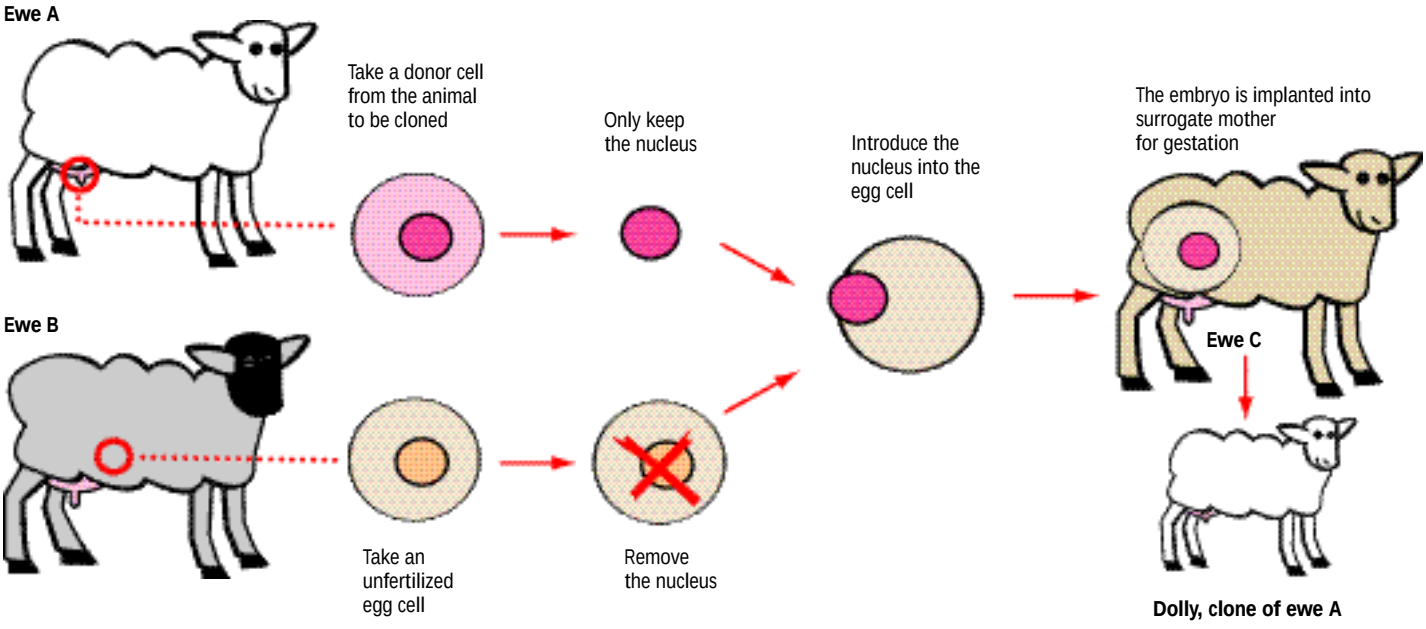
From DNA to Dolly

Genetics in three easy lessons

1. What is a gene?



2. The making of Dolly



1 Our bodies are made up of cells, each containing a nucleus of DNA (Deoxyribonucleic acid). This huge molecule resembles a sort of spiral ladder, a double helix whose parts twist and overlap. It is divided between 23 pairs of complementary chromosomes—one inherited from the father and one from the mother in each pair.

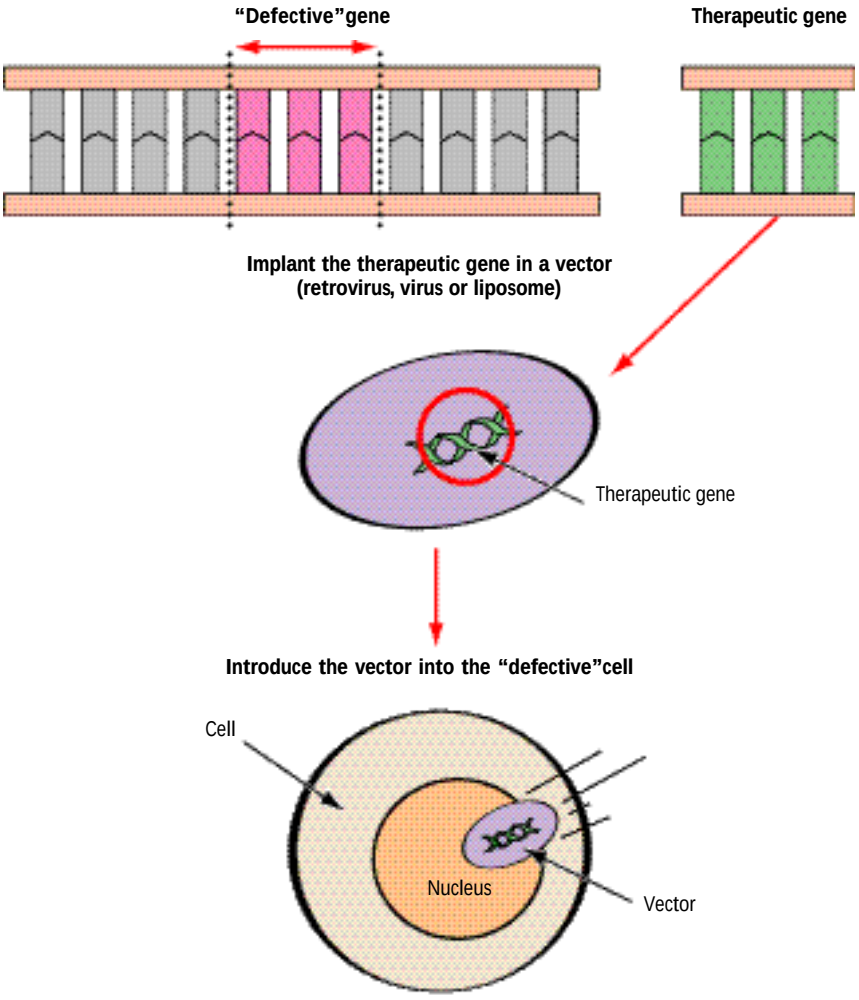
This DNA "spiral" contains about three billion "bar codes", which consist of four different bases—adenine (A in red), thymine (T in blue), cytosine (C in green) and guanine (G in yellow)—which are always linked with each other in the same way as base pairs (A with T and C with G).

About 95 per cent of the DNA in the nucleus has no known function, while the remaining 5 per cent contains some 100,000 genes. Pieces of DNA, which are so minute that they cannot be seen by a microscope, are composed of several thousands of "bar codes". The way the four base-pairs are strung together is a sort of coded message: by interpreting this code, and switching particular genes on and off, the cells manufacture the proteins which make us what we are.

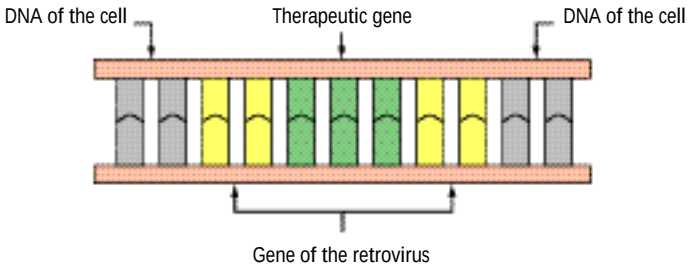
2 There are several methods of cloning. But until the birth of the cloned sheep, Dolly, in July 1996, it was necessary to use test-tube embryos derived from an encounter between an egg and a spermatozoid. The embryos were divided in two and each half implanted inside a surrogate mother to obtain two clones. The creation of Dolly was revolutionary because it did not require using a "normal" embryo (one made by an egg and a sperm). The famous sheep of the 1990s was born from the "marriage" of an egg cell from which the nucleus had been removed and an adult cell taken from the sheep to be cloned.

3 More than 4,000 genetic diseases are responsible for a third of all infant deaths in the developed countries. When "defective" genes are spotted, an attempt to "repair" them can be made using genetic engineering. Still in its infancy, this technique involves injecting "healthy" genes into diseased cells. But because of the minute size of cells and genes, it is impossible to do this "by hand" like in a normal surgical operation. So scientists use vectors—deactivated viruses or retroviruses (a special kind of virus). These carriers of "good" genes can penetrate the targeted cells of the patient by themselves. But however promising these techniques may be for the future, none is effective in treating disease at present.

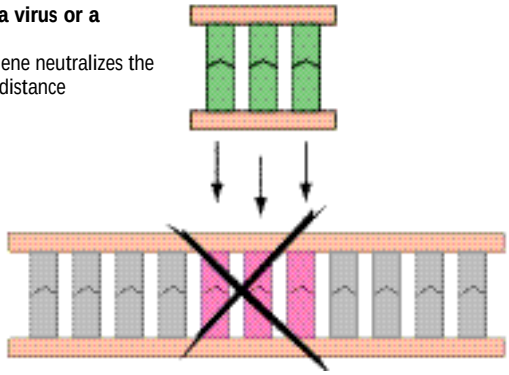
3. Correcting a genetic anomaly



a. If the vector is a retrovirus
The DNA of the defective cell recombines with the DNA of the virus carrying the therapeutic gene



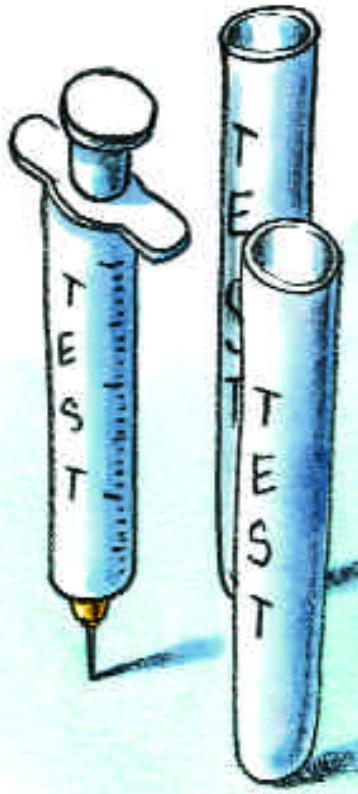
b. If the vector is a virus or a liposome
The therapeutic gene neutralizes the sick gene from a distance



Screening awakens spectres of the past

◆ Hilary Rose

Confronting the eugenic pasts of North America and Europe is a painful but crucial experience for shedding light on today's debate.



I have an intense desire to return to the womb. Anybody's.

Woody Allen, American film-maker (1935-)

For almost half a century eugenics—literally the science of "improving" the gene pool—has been equated with the horrors of Nazism. While German geneticists such as Benno Müller Hill have sought to confront the scientific community's complicity with the Nazis, systematic scrutiny of eugenic policies in other countries has long been neglected.

Historians have recently filled the gap to offer a clear, if depressing, picture of cultural and political support for eugenics in North America and in many European countries from the start of the 20th century to the 1970s. Industrial barons and political elites had predictably little sympathy for the socially disadvantaged who were the targets of eugenic policies. Surprisingly, eugenics also attracted considerable interest among welfare reformers, Marxist and socialist intellectuals as well as feminists convinced that science should help the state in fostering a genetically "fit" population. Some favoured negative eugenics, seeking to limit the production of the "unfit";others opted for positive eugenics to encourage the "fit"to have more children.

Once the horrors of Nazism were widely known, many countries were careful to avoid using the word eugenics even though they continued to practice it. These "population policies" mostly took the form of the compulsory sterilization of "feeble minded" women. Racism led to African American women being grossly over-represented among the 60,000 people forcibly sterilized in several American states from 1907 to 1960. In Scandinavia,political leaders and geneticists adopted state policies for compulsory sterilization out of concern that the emerging welfare state would encourage the "unfit" to reproduce and so reduce the quality of the national stock. In Sweden alone, 63,000 people, 90 per cent of them women, were sterilized between 1934 and 1975.Norway, a much smaller country, sterilized 48,000 in the same period. By contrast, British and Dutch geneticists and policy-makers adopted voluntary sterilization together with the mass institutionalization and segregation of the "feeble-minded".

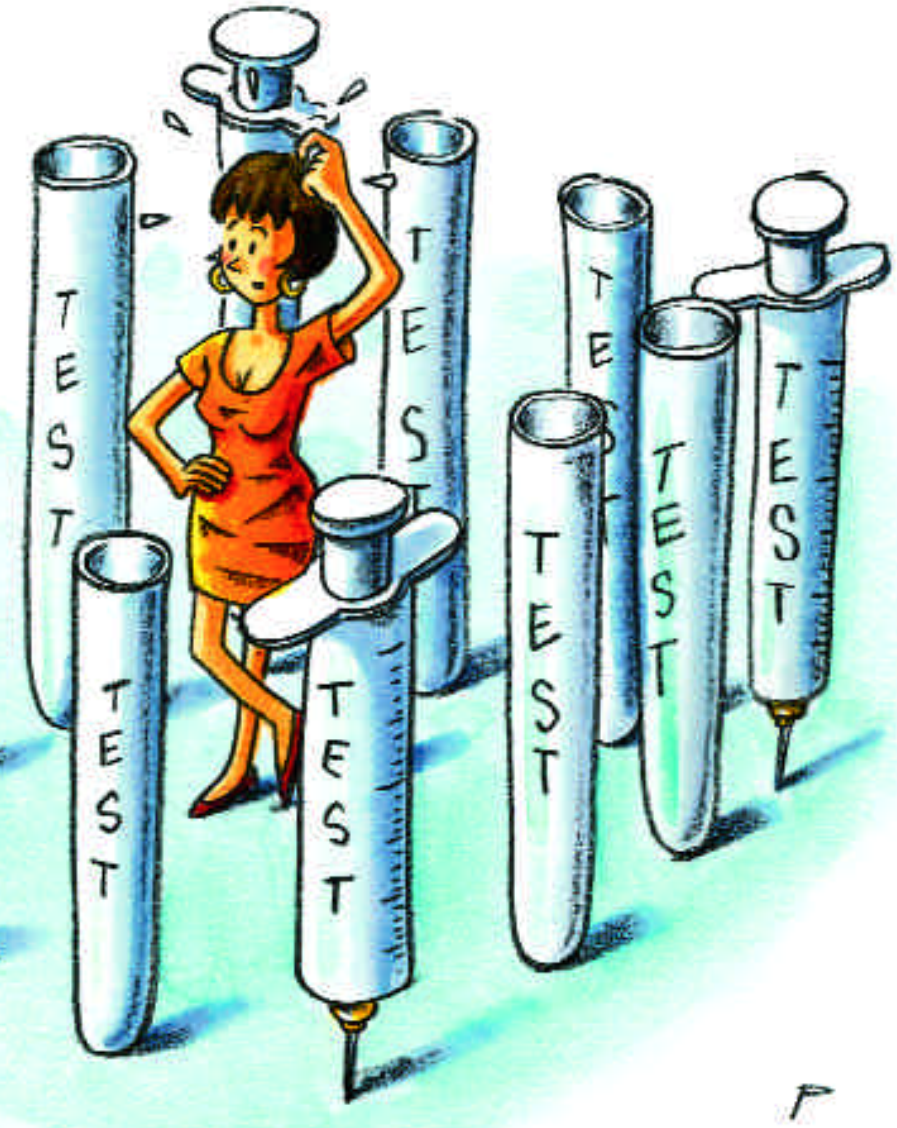
The silence surrounding these painful chapters in history is not surprising. It takes a dour courage to unearth the horrors of any nation's past. In Sweden, for example, the press first sparked public outrage over eugenics in the 1970s.Yet it wasn't until 1996 that the government agreed to compensate the women who suffered. Today's renewed interest in the past stems from founders of the Human Genome Project (HGP). From the project's conception in 1985, leading scientists like James Watson,co-discoverer of the structure of DNA, saw the need publicly to confront this sinister past to prevent the shadow of the old state-controlled eugenics from impeding the progress of the HGP. As a result, they set aside part of the three-billion-dollar research budget to study not just the past but the social, legal and ethical implications of current research. Many scientists are acutely aware that new forms of eugenics risk arising with new developments in the field of genetics.

Fears of growing stigmas

Today geneticists are generally very careful to avoid any links to state-controlled eugenics by adopting a new approach with a Janus-like posture. Facing the patient—the would-be parent—they provide informed choice about DNA testing. Facing the state, they promise that fewer disabled children will be born. However, as more foetuses are screened for a growing range of conditions, many voices within the disability movements argue that "testing" amounts to searching for the "abnormal". This "search" steadily reduces our notions of what it is to be "normal", and this, activists say, will intensify the stigmatization of all disabled people.

Some activists have come close to an absolutist opposition to all DNA testing to prevent women from aborting so-called "abnormal"foetuses. This position has predictably raised serious concern in the

◆ Professor of Physic (medical ethics) at Gresham College, London. Author of Love, Power and Knowledge: Towards a Feminist Transformation of the Sciences (Cambridge Polity, 1994)



global movement of women struggling to control their own fertility. Indeed, the disability movement can look like an ally of pro-life groups. Yet it is possible, as disabled feminist groups have shown, to share the disability movement's concerns and still defend women's reproductive rights.

The "genetically approved"

To begin with, it is crucial to recognize that despite the proliferation of DNA tests—each patented and profit-yielding—genetics has so far failed to fulfill its vaunted promises of gene therapy. Doctors are screening for conditions and disorders which they cannot treat. So abortion is often presented as treatment. Meanwhile a good mother-to-be is expected to accept every test she can either afford or the state provides. For many bioethicists, feminists and disabled rights activists, this proliferation of DNA tests opens the way to "consumer eugenics" which in the guise of offering greater reproductive choices in practice applies pressure to select the "genetically approved".

To assure truly free reproductive decision-making, it is crucial to ask: who benefits from the tests—individuals or companies selling them? For most women—not all—a DNA test which can accurately indicate a terrible genetic disorder in the foetus enhances, even if sadly, her ethical choices. But what about the possible proliferation of DNA tests for relatively minor genetic disorders, like deafness or restricted stature?

Another major ethical issue lurks in the proliferation of DNA testing: by focusing on genetic weaknesses, we may neglect environmental factors, like poverty. American sociologist Troy Duster points out that the most effective way—in both medical and economic terms—to promote the birth of healthy newborns lies in helping poor women eat properly during pregnancy. In the state of California, more infants suffer from the serious and often fatal health problems caused by low birth weight than by genetic disease. For Duster, the state decision to invest in DNA testing instead of anti-poverty programmes opens the "backdoor to eugenics" with painful implications in view of the fact that African Americans are massively over-represented among the poor.

How can we better manage this powerful biotechnology? We can begin by stimulating an informed debate about the possibilities and limits of DNA testing. The public needs a solid information base to take an active part in developing sensitive and effective regulatory systems. Screaming headlines announcing "designer babies" in which fantasy parents choose the height, intelligence, looks and behaviour of their future offspring will do little to help us resolve thorny ethical questions arising. Instead, we might begin by learning from the two countries where the public trusts its government most when it comes to biotechnology, Denmark and the Netherlands. It is not by chance that they have done the most to manage these technologies democratically. ■

Timeline

1840-1850: The start of modern embryology. The Estonian Karl Ernst von Baer describes the first stages of the formation of an embryo.

1866: A Czech monk, Gregor Mendel, develops laws of heredity after experiments with peas.

1875-1883: A German anatomist, Walther Flemming, counts the number of human chromosomes. He finds 24 pairs, a figure amended to 23 by the Indonesian scientist Joe-Hin Tjio in 1956.

1905: "Mendelism", the study of heredity, is renamed "genetics" (from the Greek word gene - tikos, meaning generate) by the British biologist William Bateson.

1953: Biologists James Watson (U.S.) and Francis Crick (UK) discover the "double helix" structure of DNA. This marks the real beginning of molecular genetics, which expresses genetic information in physico-chemical terms.

1973: The first experiments in human cloning by dividing an embryo. Also the first transgenesis, the artificial transfer of genetic material from one species to another. The age of genetic engineering begins.

1978: The birth in Britain of Louise Brown, the first test-tube baby, conceived by in vitro fertilization.

1990: The Human Genome Project is launched to locate and identify all the genes of human DNA before the year 2003.

1995: Mark Hughes makes the first clones of human embryos by transferring the nucleus, destroying them after a few weeks.

1997: British embryologist Ian Wilmut announces he has cloned a sheep, which he calls Dolly, from an "adult" cell (see pages 20-21). ■

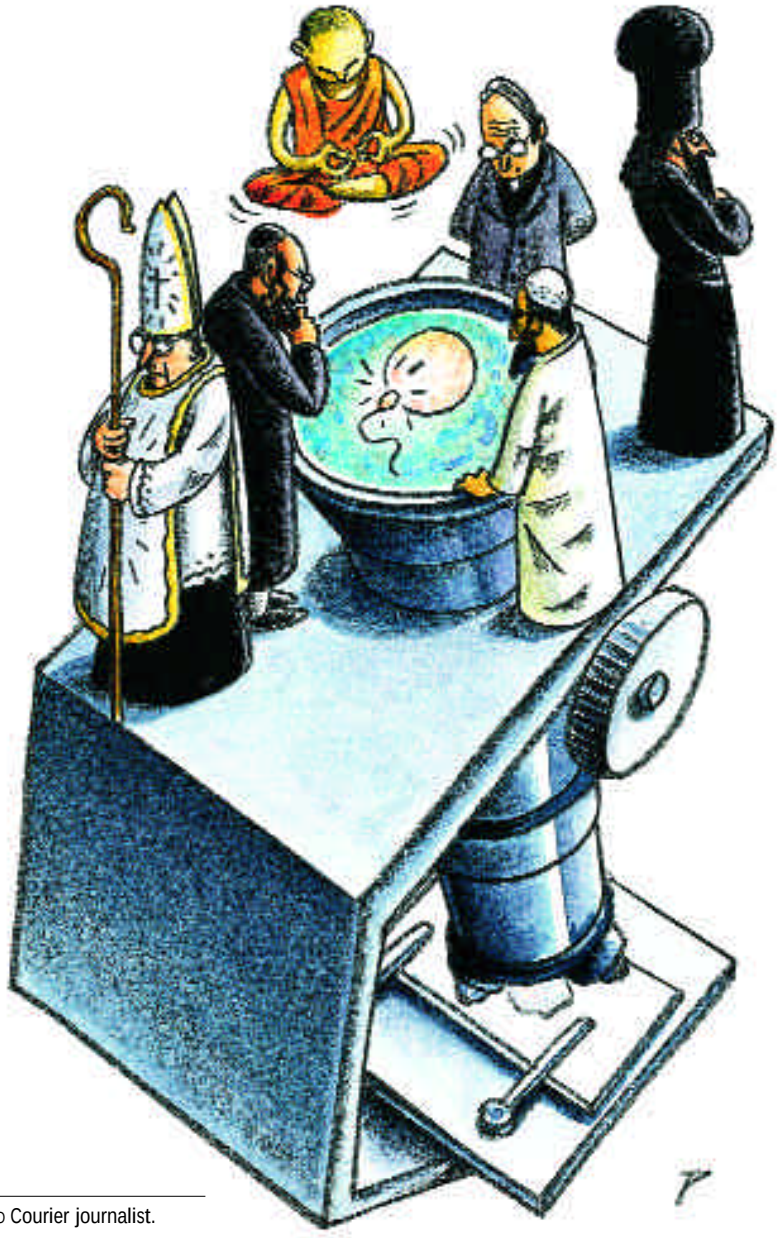
Religion, genetics and the embryo

◆ Sophie Boukhari

Catholics, Protestants, Buddhists, Muslims and Jews bring an array of responses to the bioethical questions posed by genetic technologies.

Once upon a time Christian theologians argued about the sex of angels. Nowadays they argue about the soul of the human embryo in a debate that concerns creatures of flesh and blood and spills way beyond Christianity.

"Although religious practice may be declining," says French geneticist and Member of Parliament Jean-François Mattei, "the metaphysical issue is still at the core of the questions raised about genetic engineering, either by tradition, culture or duty."



Should a person have recourse to prenatal screening and consider having an abortion if a serious genetic defect is discovered? Should research on embryos, gene therapy and cloning be allowed?

All the "religions of the Book"(Christianity, Judaism and Islam) believe that the answers to these questions largely depend on the status of the embryo. The frontier between "good" and "bad" genetic engineering depends on whether or not the embryo is considered to be "animate".

An "opposition front"

"If the embryo has a soul,then it is endowed with a human as well as a biological life and any attack on its integrity is seen as a crime," says French geneticist René Frydman."If it is inanimate, the prohibition remains—God-given life should be respected—but the offence is less serious."

The Catholic Church is in many respects a special case. For a start, it has a single "magisterium" or teaching authority, whereas other religions have a more familiar approach, such as discussions with a rabbi (Jews), priest (Orthodox Christians) or master (Buddhists). Other religions also have various branches (reformed and orthodox Jews,many broad streams of Buddhism) or schools of jurisprudence (Malikite,Hanafite, Shafi'ite and Hanbalite among Sunni Muslims, for example). Most important of all, while all the major religions generally believe human life and dignity should be respected, the Church of Rome is the only religion that considers the embryo "as a human being from the moment of conception", and it sticks firmly to this doctrine.

Pope John Paul II has repeated it several times, notably in the encyclicals *Veritatis Splendor* (1993) and *Evangelium Vitae* (1995). These have resulted in a number of prohibitions: "no" to prenatal screening if it it is done with the thought of a possible abortion and "no" to most research and therapy on embryos. The Vatican is also against both reproductive and therapeutic cloning on the grounds that it violates the "unified totality" of

◆ UNESCO Courier journalist.

Man has been truly termed a "microcosm", or little world in himself, and the structure of his body should be studied not only by those who wish to become doctors, but by those who wish to attain to a more intimate knowledge of God.

Al-Ghazâli, Muslim theologian (1058-1111)

the human person and the sacred link between sexuality and procreation.

The positions of Orthodox Christians are very close to those of the Vatican. But the "opposition front" to genetic technologies is limited to these two groups. For Islam and Judaism, the important principles are the moment when the embryo acquires a life of its own and respect for descendance. The Koran says in Surat 23: "And certainly We created man of an extract of clay, Then We made him a small seed in a firm resting-place, Then we made the seed a clot, then we made the clot a lump of flesh, then We made (in) the lump of flesh bones, then We clothed the bones with flesh, then We caused it to grow into another creation."

But some Muslims believe it is 40 days before the soul (*ruh*) enters the embryo, while others believe it is 120. At the same time, while prenatal screening is accepted, there is argument over abortion. H'mida Ennaifer, of the Higher Institute of Theology in Tunis, says "Islamic jurists all condemn abortion after the foetus has received the breath of life. Some Malekites condemn it even when the child is less than 40 days old while other schools of thought allow it during the first four months of pregnancy."

Islam also allows gene therapy on the human body, but in general it proscribes the modification of germ-cells and bans anything which denies the notion of divine creation, starting with cloning. However, a minority of jurists regard cloning as sometimes preferable to "genetic adultery" because it respects the line of descent by avoiding a situation where a sterile couple uses sperm or eggs from a donor in artificial insemination.

Jews cite the Bible and the Talmud. When the Talmud reports that during the miraculous crossing of the Red Sea by the Israelites (Exodus, chapter 15), even the unborn children in their mothers' wombs praised God, it comments that "if they could praise the glory of God, it means they have a soul and a conscience." This comes about after the 40th day, the Talmud says. Until then, the embryo is "only water". So to obey the *halakha* (Jewish Law), it is preferable to carry out prenatal screening before the 40th day. After that, abortion is not allowed unless the mother's life is in danger. In practice, it all depends on what the rabbis say. Some hold that if the mother has a nervous breakdown when she learns she is carrying a child with an incurable condition, abortion is permissible, even after the 40-day limit. Other rabbis are a lot stricter.

Jews allow experiments with embryos, especially if they have no chance of surviving. Judaism also does not rule out cloning, says French theo- ▶

ISRAEL: DNA MATCHMAKERS

◆ Rae HB FishMan

Love is made in heaven, but for many people, marriages are arranged on Earth. For ultra-orthodox Jews, marriages are made between families as much as between individuals, on the basis of mutual interests. "Intelligence and scholarship are highly valued, naturally, but background, social position, wealth and health are also important," says Israeli rabbi Yigal Bezalel Shafran.

Families known to be genetic carriers of fatal diseases are stigmatized, because in this strictly observant community abortion is generally forbidden unless the mother's life is endangered. Yet Ashkenazi Jews (of Eastern European origin) have the highest risk of Tay-Sachs, a genetic disease causing dementia and death in childhood. The risk of carrying the disease can run as high as four per cent for the Ashkenazi (one in 25) compared to 0.2 per cent for non-Jews and Sephardic Jews (of Mediterranean origin).

In 1983 a rabbi and a doctor in New York created Dor Yeshorim, a non-profit organization which provides Ashkenazi with pre-marital genetic tests to avoid the betrothal of two carriers of a fatal or severely debilitating genetic disorder. About 70,000 people in New York, Israel and the United Kingdom have been tested for Tay-Sachs and other genetic diseases like cystic fibrosis. The programme started in Israel in 1986, and since then not a single Tay-Sachs child has been born in the ultra-orthodox Ashkenazi community. It works because both the spiritual leaders and the community agree with its principles, practices and results.

Yet some medical geneticists oppose the programme on the grounds that it snubs Western medicine's standard of privacy and the individual's "right to know" because the test results are returned to the "more objective and less emotionally involved" Dor Yeshorim rabbi, and not to the individuals tested. The prospective couple is informed only if both members are carriers, in which case they usually seek other partners. If just one of the pair is a carrier, no one is told and the marriage plans proceed.

There may be a lesson here for other cultures and even for Western science. As genetic screening tests are increasingly available, mostly for diseases with no cure, people may have to bear what Rabbi Shafran calls "an emotional burden of knowledge that can only cause distress". This burden might be eased if the right to knowledge is vested in their social group, in other words, if individuals choose the "right not to know". ■

◆ Israeli-based scientific journalist

logian and jurist Raphaël Braï. "If cloning is done for therapeutic reasons, the matter has to be discussed with other people. Several religious notions clash at this point. For example, the oneness of the human person and the duty to heal oneself." But cloning for reproductive reasons is not allowed, with few exceptions.

Protestant Christians are generally even more open to advances in genetics. They stress free will and regard each case on its merits, leaving a decision to the couple involved. "Some allow prenatal screening followed by an abortion if the woman so decides," says Carlos de Sola, head of the bioethics unit of the Council of Europe, which has arranged discussions between religious authorities. "Some people even endorse choosing the sex of a future child through sperm selection, so as to create a family containing both boys and girls." Protestants approve of research using embryos as long as it is strictly supervised. They do not rule out cloning either, though they reject cloning for profit or for eugenic reasons.

Buddhists are even less dogmatic because they believe all truth is relative. A French expert in Buddhism, Raphaël Liogier, notes that "the only ethical limit is suffering, for Buddha is primarily a healer." The Dalai Lama, leader of Tibet's Buddhists, says what mainly has to be taken into account are "the good effects and bad effects of genetic engineering." He agrees that it can be used to "improve the human body—the brain, for example."

"The body is only a vehicle for karma [the ethical consequences of a person's actions that determine their destiny in their next incarnation]," says Liogier. "If the body has been genetically altered or cloned, it's really not very important. Abortion however is frowned on because it damages karma."

But again, everything is relative and the main concern is to avoid pain. The Dalai Lama says "abortion is allowed when a pregnant woman might die if she gave birth or bear a severely handicapped child."

The range of answers religions give to bioethical questions is very varied and constantly changing, except for the rigid doctrine of the Vatican and the inflexibility of fundamentalists in all religions. Faced with problems which go to the origin and meaning of life itself, says Frydman, "religious opinions are probably a big help because they recall humanity's root values without trying to impose them and are a forum for discussion, not a body of dogma." ■

U.S.: Dream child or nightmare scenario?

New technology making it possible to produce children immune to chronic genetic disease also paves the way for 'designer babies' for parents who can afford them. This prospect is opening a Pandora's box of ethical, social and legal dilemmas—nowhere more than in the United States.

1. Medicine's last frontier

◆ Lee M. Silver

◆ Professor at Princeton University in the Departments of Molecular Biology, Ecology and Evolutionary Biology and in the Woodrow Wilson School of Public and International Affairs. Prof. Silver is the author of Remaking Eden: Cloning and Beyond in a Brave New World, Avon Books, New York, 1998.

Boston, USA: June 1, 2010

Barbara is nursing her new-born baby, Max. "My husband and I chose him from the embryos we made," she tells a friend. "We also made sure that Max wouldn't turn out to be fat like my brother Tom or addicted to alcohol like my husband's sister."

Seattle: March 15, 2050

Melissa is in the early stages of labour in a maternity ward. To take her mind off the contractions, she looks at computer-generated pictures of a five-year-old girl with blond hair and green eyes and others of the same girl as a teenager. This is Melissa's yet-to-be-born child. What cannot be seen is that she has a package of genes to provide her with lifelong resistance to HIV infection.

Washington, DC: May 15, 2350

The country is divided into two classes: the GenRich, whose families invested heavily in the genetic design of their offspring, and the Naturals, whose families couldn't afford to do so. The GenRich make up 10 per cent of the population, and dominate the upper echelons of society, while the Naturals work as low-paid service providers. GenRich parents pressure their children not to dilute their expensive genetic endowment by marrying Naturals.

This is not an exercise in Hollywood screenwriting. These scenarios emerge from our current base of scientific and technological knowledge.

Since the 1980s, genetic engineering has been successfully practised with mice, cows, sheep and pigs. It hasn't yet been applied to human beings simply because

the most basic technique for adding genes to embryos has a success rate of only 50 per cent at best. And for the even more complicated task of altering genes to cure disease, the odds are about a million to one.

But with cloning, the entire equation changes. You can now take a cell from a fertilized egg of just a few days and then clone it to make millions of copies which could then be engineered by, for example, injecting foreign DNA through a microscopic needle. Thanks to the "Wilmut technique" (see page 21), the scientist can then take a properly engineered cell's nucleus and insert it into a fresh egg which is placed in the mother's womb.

This is just one of many approaches now being developed in laboratories. By using one or a combination of them, genetic engineering of human embryos will be safe and efficient by the middle of the 21st century. We will face the ultimate frontier in medicine and philosophy—the power to change the nature of the human species.

Genetic engineering will begin in a thoroughly acceptable manner, by treating severe childhood diseases like cystic fibrosis. Services will then steadily expand in two distinct phases. In the first, parents will give their children genes that others naturally have. For example, they will incorporate within their embryos the genes which make some people naturally resistant to certain forms of cancer or HIV infection (about one per cent of the American male population has a gene making them immune to HIV infection). At the same time, they may reverse predisposition to conditions like obesity or alcoholism and diseases like diabetes.

Geneticists will then focus on the mind and senses. To begin with, doctors will replace or alter genes linked to mental diseases and antisocial behaviour like extreme aggression. As technology improves and spreads, parents will have the choice of enhancing artistic potential, for example, by heightening visual or auditory acuity. With better understanding of the human brain, we will enhance cognitive abilities by, for example, strengthening the gene responsible for converting short term memory into long term memory. This is now being done in mice.

All of these services involve altering or adding genes which already exist in the human genome. However, in the second phase of genetic engineering, we will actually introduce new genes into the genome. Humans might develop night vision by gene-transfers from bats or entirely new traits like the ability to decipher radio waves. Obviously, this kind of engineering will take a great deal of time to develop because of the complexity and risks involved. We cannot introduce a gene into the human genome without being certain that it won't cause any harm.

One way or another, we will see an exponential rise in the number and variety of possible genetic extensions—like the additions to computer operating systems that occurred during the 1980s and 1990s. Extensions that were once unimaginable will become indispensable . . . to those parents who can afford them. ■

2. The dangers of laissez faire

◆ Amy Otchet

◆ UNESCO Courier journalist

"With QualGene services, you too can have the highest quality embryo money can buy. Our scientists are dedicated to your heritage—don't leave your precious children to chance!"

It's just a matter of time before such an ad tantalizes prospective parents of the United States, says Dr. Jeffrey Botkin, a bioethicist and pediatric geneticist. Americans have a heart-felt fetish for doing everything possible to help their children succeed. So why not give them the ultimate headstart by selecting the "best" from a batch of fertilized eggs or by one day genetically enhancing a child-to-be?

Welcome to the world of laissez faire eugenics, says Arthur Caplan, one of the most influential American bioethicists. "This simply means that people are free to choose how they want to design their children, with the constraints that they don't kill, harm or make them worse off," says Caplan, of the University of Pennsylvania. "If you're not taking any [health] risks, ▶

then it's hard to criticize the goal of trying to biologically make your child better."

Not so for the philosopher who first coined the term laissez faire eugenics, Philip Kitcher of Columbia University. "We're putting the rat race into the womb," he says. "I used to be more optimistic," thinking that education and support for the disabled would lead to a genetic utopia free of discrimination. "But now I see the root of the problem goes deep into capitalist society with the pressure to compete," says Kitcher. "Parents with the resources will feel pressured to make sure that their children have 'the right genetic stuff.'"

Picking and choosing 'desirable' traits

As geneticists develop new DNA tests and techniques to screen and perhaps one day enhance embryos, "parents will be torn between the desire to do the best they can for their child and their perception of the prejudices and inequalities surrounding them," says Kitcher. Imagine a couple sorting through a batch of in-vitro fertilized eggs. Perhaps scientists will find that there are certain genes which correlate with same sex preference. "Then we can expect some parents to say, 'we're not prejudiced *but* it's awfully hard for a lesbian daughter to make it in our society. . . ." Genetic testing, says Kitcher, will be used to weed out "undesirables" the way amniocentesis is now used in China and India for sex-selection. This laissez faire eugenics will creep up on society as people increasingly look to genetics to relieve—not resolve—problems caused by social situations. Skin colour could be considered a social handicap, in which case an Afro-American couple might seek to produce a white baby. While doctors might refuse the request, it begs the question as to whether or not the government has a role in regulating the selection and, perhaps, one day, the enhancement of embryos.

Legal regulation "is not likely to happen and I'm not sure that it should," says Caplan. In the United States, "personal choice is believed to be the best answer to questions of conception and reproduction," he says, explaining that this commitment to privacy has kept abortion legal. If government began regulating the conditions in which children are born, anti-abortion groups might find a way of curtailing women's rights to control their fertility. Besides, says Caplan, how can government begin limiting what parents biologically offer their children when they have virtually free rein in environmental matters such as religion and education? Caplan also points out that genetically enhancing an embryo will not be the same as "programming" a child. A strict religious upbringing may mould a child far more than enhanced athletic ability, for example. Besides, is there anything wrong with giving a child improved memory?

The problem, says Kitcher, lies in the cumulative effects of individuals' decisions. A more homogeneous society will emerge as parents select some traits over others. This won't lead to a Hollywoodesque scenario of a nation dominated by chubby blond cherubs with blue eyes. Instead, Kitcher warns that the focus on picking and choosing "desirable" traits may reduce respect for diversity, reinforce racism and widen the gap between those who can and those who cannot afford the latest genetic services.

> While the law [of competition] may be sometimes hard for the individual, it is best for the race because it insures the survival of the fittest in every department.
>
> **Andrew Carnegie, American industrialist (1835-1919)**

Ethically this would be wrong, says Caplan, but "there is no escaping it." Restricting individual liberty for the common good is not the "American way". "We rely on the wisdom of individual choice to get to the greater benefit—not some notion of an agreed upon collective benefit," says Caplan.

Yet there may be some legislative room for manoeuvre, says Lori Andrews, director of the Institute of Science, Law and Technology in Chicago. Constitutional protections prevent the government from interfering in a couple's decision to have or not have a baby, says Andrews. This does not guarantee absolute freedom in deciding what kind of child to have or under what conditions.

A major stumbling block to regulation lies in the raging conflict between anti-abortion groups and the scientific community over embryo research. Extreme positions on both sides have led to a "legislative vacuum", says Andrews, leaving the private sector to pursue the research beyond the scrutiny of federal review boards. As it stands now, the Food and Drug Administration (FDA) is supposed to decide which genetic tests and treatments are available to consumers. The problem, says Andrews, is that FDA decisions are based on safety and efficacy—ethical considerations and public debate are not part of the equation.

Marketing campaigns

The legislative vacuum leaves a lot of responsibility on the doorstep of the medical community. Enormous profits stand to be made in the emerging field of reproductive genetic services. Marketing campaigns will focus on the "perfect baby" to convince parents that their children-to-be require "the best money can offer" in prenatal diagnoses and enhancement. With these commercial pressures, parents will need medical and ethical guidance to evaluate the products.

Yet "the medical profession has gotten little beyond identifying the problems," says Dr. Botkin of the University of Utah. Doctors are trying to adopt a "non-directive" approach when revealing the results of prenatal tests. But as Botkin points out, reproductive decision-making begins with the choice of tests taken. Professional standards traditionally reflect the minimum a doctor should do in particular circumstances. As genetics develops, doctors will need to consider the maximum. Yet they alone cannot set the limits which, Botkin says, require a broad social dialogue.

The need for public debate is perhaps the one point on which everyone agrees. While bioethicists like Caplan focus on "good parenting", Kitcher goes a step further. "When we begin talking about how to groom human beings from the womb on, something has gone awfully wrong in our society," he says. "Part of the solution lies in legislation but part lies in modifying the culture of the affluent society. We are living in a time of the self-professed triumph of capitalism. As a philosopher, I am inclined to ask: is this competition good for us and our children?" ■

In India, sex selection gets easier

◆ R. Ramachandran

New sex pre-determination techniques are likely to reinforce anti-female prejudice.

The best of either sex should be united with the best as often as possible, and the inferior with the inferior as seldom as possible.

Plato, Greek philosopher (428-348 BC)

A single word on a sign advertises a thriving business in India: ultrasound. Using sound waves to produce images of foetuses, this diagnostic tool is a common part of prenatal care. But in India, advertisements for ultrasound carry a hidden message: doctors will use the tool to reveal the sex of the unborn, opening the way to abort "negative" results, meaning in effect females.

Clinics have resorted to this disguised advertising since a law enacted in 1996 banned the use of prenatal testing for sex selection. Doctors are only allowed to test foetuses for genetic and congenital abnormalities or disease. In principle, they can be prosecuted for giving the faintest hint as to the sex of a foetus.

Yet the law looks better on paper than in practice, admits S.C. Srivastava, Policy Director of the central government Health Ministry. Registration of clinics has been slow and there has not been a single prosecution despite official acknowledgment of widespread abuse. One reason is that abortion up to the 20th week of pregnancy is legal, even though sex selection is not. It is hard to prove an abortion is done for sex selection.

Female foeticide

Sex determination has been rampant in India since the 1970s when doctors began misusing amniocentesis (analysis of uterine fluid). A 1985 survey in Bombay, for example, revealed that 90 per cent of amniocentesis centres were involved in sex determination, with nearly 96 per cent of female foetuses aborted. Today, ultrasound is the preferred method, with some 1,500 clinics operating in Punjab alone, a northern state of over 20 million people where India's first sex determination clinic was set up. The only thing the law seems to have done is to raise doctors' fees from about $10 to $30 a session to compensate for the risk of criminal prosecution. The situation will even get worse with a new wave of ultrasound units, says Dr. Sharada Jain, a well-known Delhi gynecologist. Amniocentesis is effective in sex determination in the 16th to 18th weeks of a pregnancy. Today, abdominal ultrasound imaging can tell the sex of a foetus with 90 per cent accuracy at 14 weeks. More advanced trans-vaginal ultrasound—widely-used in Delhi and spreading elsewhere—has even greater accuracy at 12 weeks. Thus female fœticide is now possible in the first trimester when abortion is less complicated and there is less suspicion of sex selection, says Dr. Jain.

The heart of the problem is traditional attitudes towards females, insists Dr. Mira Shiva of the Voluntary Health Association of India in New Delhi. Daughters are seen as an expense particularly because of the dowries families pay to marry them off. Under such circumstances, the law banning sex selection is a "non-starter," says Dr. Shiva.

Given this value system, how would people respond to new genetic technologies to pre-select the sex of embryos? An American fertility institute recently caused a stir with a new technique, MicroSort, which separates sperm bearing X-chromosomes (producing females) from those with Y-chromosomes (producing males). Doctors report a 93 per cent success rate for producing girls and 73 per cent for boys. The current $5,000 cost of such a procedure is expected to fall and doctors believe it is only a matter of time before the new sex pre-determination technique hits India.

"I can easily provide the service within months," says Dr. Anoop Kumar Gupta of Delhi IVF and Fertility Clinic. "If I do, I will have hundreds of clients queuing outside." Some doctors in India, like Dr. T.C. Kumar of Hope Infertility Clinic in Bangalore, believe the pre-determination technique would stem female fœticide. "The ethical choice lies between the prevention, and the perpetuation of fœticide, infanticide and homicide of females," says Dr. Kumar. "Social change is a long, drawn-out process. Can we afford to wait until these changes occur?"

But according to Dr. Shiva, sex pre-selection would only feed the "pathological condition of our society which discriminates and denigrates women." ■

◆ Delhi-based Indian science journalist

Is China's law eugenic?

China's approach to family planning has been attacked in the West as authoritarian and an infringement on individual rights. Below, Chinese Academician Qiu Renzong rejects claims that his country's Law on Maternal and Infant Health is eugenic. Overleaf, a German Sinologist challenges Qiu Renzong's position.

1. 'A concern for collective good'

◆ Qiu Renzong

China's Law on Maternal and Infant Health (see box opposite page) has attracted considerable criticism in the Western media and scientific circles. Some of the criticism is valid but some is based on misunderstandings caused by linguistic or cultural barriers. Much of the confusion revolves around the word *yousheng*, which repeatedly occurs in the legal text. A tricky word with dual meanings, it is commonly used to mean "healthy births" in association with child-rearing. However, *yousheng* can also be used to describe eugenic programmes such as that practised by the Nazis. Unfortunately, English translations of the law tend to reflect this latter meaning.

Is the Maternal and Infant Health Law eugenic? I would argue that for a policy to be eugenic it must first reject individual consent and second, be based on racism. Neither of these conditions applies to China's law. While doctors may advise two individuals at risk of passing on hereditary disease to refrain from marrying or to undergo sterilization, the ultimate decision is left to these adults. When prenatal testing reveals genetic disease, a doctor will offer advice—not a directive—concerning abortion.

The way to a higher domain

It is also crucial to recognize that the law is not motivated by racism but by a desire to reduce birth defects. Indeed, there is no racist tradition in China. The Chinese have been the victims of Western imperialism and Japanese militarism. They may have made grave mistakes, but they have never claimed superiority over another people, and their military actions have never been motivated by racism. Nor is racism part of China's internal policies. The Han, China's dominant ethnic group, do not claim superiority over China's minorities.

Westerners are often shocked by Chinese attitudes to defective foetuses because they do not understand the cultural and economic factors involved. The great Confucianist Xun Zi (300-237 BC) said: "Birth is the beginning of a human being, and death is the end of a human being. A human being who has a good beginning and a good end fulfills the Tao [the Way to a higher spiritual domain]." Two major factors shaping genetic policy in China emerge from this Confucian view. First, abortion is morally and socially acceptable because life begins with birth. A foetus is not considered a human being. Second, congenital disease and deformity are considered a sign of sin committed by the parents or ancestors in their previous life. Given that a defective newborn child is traditionally called a "monster foetus", it is not surprising to find little in the way of familial or social support. One of the parents of a deformed baby will usually have to stop working, and the costs of caring for such a child can amount to a third of an average worker's salary.

Poverty

Changing these negative attitudes will take a great deal of time. There are now more than 50 million handicapped people, mostly living in poverty, and it is unreasonable to expect any major improvements in the treatment of handicapped children and their mothers in the near future. In this context, many feel that these children and their mothers would be better off if the handicapped had never been born. In fact, the Chinese Association of the Handicapped formally urged the government in 1989 to speed up legislation to prevent the birth of deformed babies, given their suffering and the burden they represent for society.

The concern for the collective good has at times led geneticists and others in China to infringe upon individual autonomy. They have confused what is technologically possible (genetic testing) with what is ethically permissible. However, I feel that the law is a positive step towards guaranteeing everyone access to genetic counselling and to prohibiting sex-selection. Chinese geneticists and bioethicists have criticized some articles of the law. Their suggestions include more explicit recognition of the principle of informed consent. Last year, the authorities consulted leading Chinese bioethicists and geneticists and will make the needed changes at an appropriate time. Meanwhile, I would ask Western colleagues to directly consult officials, geneticists and citizens instead of trying to sanction China, which may do more harm than good. ■

If the twentieth part of the cost and pains were spent in measures for the improvement of the human race that is spent on the improvement of the breed of horses and cattle, what a galaxy of genius might we not create.

Francis Galton, British scientist, initiator of the study of eugenics (1822-1911)

◆ Bioethics programme director, Chinese Academy of Social Sciences, Beijing

2. 'The legislation imposes decisions'

◆ Frank Dikötter

◆ Director, Contemporary China Institute, School of Oriental and African Studies, University of London

Supporters of China's Maternal and Infant Health Law often argue that the word *yousheng* is mistranslated as "eugenics",instead of "healthy birth". Besides the simple observation that a term has no given meaning outside the context in which it is used, it might be noted that in European languages the word "eugenics" also etymologically refers to "healthy birth" (Greek root meaning "good in birth").

The term *yousheng* appeared in China during the 1920s when many publications on eugenics were translated or written in Chinese. The international eugenics movement, spanning from Sweden to Japan, was embraced by many intellectuals in China. Some openly praised Nazi racial policies, while others adopted a softer approach aimed at preventing "unfit" individuals from reproducing. While eugenics became taboo after the communist take-over in 1949—as it did elsewhere in the world given its association with Nazism—it reappeared as an intrinsic component of the one-child policy of 1978.

Today, large numbers of popular and scientific publications still hail the British scientist Francis Galton (1822-1911; Charles Darwin's cousin, the founder of eugenics) as the father of *yousheng* which they clearly define as the science by which the state can improve the physical and mental features of its population by selective breeding.

The law's supporters strongly emphasize its recognition of "individual consent": but what real effect can "individual consent" have in a one-party state such as China, where political dissent is so often punished? These supporters tend not to mention the half a dozen provincial laws passed since 1988 which never mention individual wishes: in Gansu province, for instance, "idiots","cretins" and "imbeciles" (not defined in medical terms) are not allowed to marry unless they have been sterilized.

It is crucial to understand that racism is not a necessary component of eugenics. Thousands of individuals judged to be mentally impaired were forcibly sterilized in Scandinavian countries until the 1960s without being defined as "racially" different. To defend China's law by arguing that the Han do not think of themselves as superior to "minorities" is seriously misleading. Why not ask ethnic Tibetans what they think about this?

An inalienable right

Eugenic laws in China fall largely on two groups: peasants (about 70 per cent of the population) and ethnic minorities, (55 groups comprising about eight per cent of the population). In specialist and popular publications, Chinese geneticists claim to find higher rates of mental and physical handicap among the peasantry than the urban population. They also claim that there are higher rates among at least some ethnic minorities in comparison to the majority Han. These geneticists maintain that the economic backwardness of these groups is reinforced by inbreeding. I would argue that this is no more than a scientized version of Han prejudice against minority endogamic practices.

"Confucian values" are also evoked to justify the 1995 law. China is not frozen in time. To invoke Xun Zi in the 1990s is as useful as referring to the Spartans to explain Nazi policies. Reproductive freedom is not the prerogative of a few privileged cultures, but an inalienable part of individual rights. Coercive methods of controlling population growth cannot be defended on cultural grounds. The sterilization programmes used in India during the "emergency period" in the 1970s, for example, were overwhelmingly rejected once general elections were held. Besides, research shows that in China and elsewhere individuals have very different views on the treatment of handicapped people. In surveys by Chinese researchers in the late 1980s, up to 25 per cent of those questioned considered life to be sacred in all circumstances. Serious birth defects are one of the most painful challenges any family can face, and all possible ethical considerations and medical options should be carefully considered and openly debated. The present eugenic legislation does not reflect this consensus-making process; it imposes decisions.

Even in democratic countries, marginalized people may be treated in a discriminatory way, as social prejudice and economic interest affect the nature of genetic information made available to families, employers, insurance companies or welfare states. In a one-party state like China, eugenic laws have been used to suppress rather than assist vulnerable people. ■

POINTS OF LAW

The following are key excerpts from the official translation of China's Maternal and Infant Health Care Law, which came into effect in 1995.

Article 8: The pre-marital physical check-up shall include the examination of the following diseases:(i) genetic diseases of a serious nature;(ii) target infectious diseases;and (iii) relevant mental disease.

Article 10: Physicians shall, after performing the pre-marital physical check-up, explain and give medical advice to both the male and the female who have been diagnosed with certain genetic disease of a serious nature which is considered to be inappropriate for child-bearing from a medical point of view;the two may be married only if both sides agree to take long-term contraceptive measures or to take ligation operation for sterility.

Article 16: If a physician detects or suspects that a married couple in their child-bearing age suffer from genetic disease of a serious nature, the physician shall give medical advice to the couple, and the couple in their child-bearing age shall take measures in accordance with the physician's medical advice.

Article 18: The physician shall explain to the married couple and give them medical advice for a termination of pregnancy if one of the following cases is detected in the prenatal diagnosis: (i) the foetus is suffering from genetic disease of a serious nature; (ii) the foetus is with defect of a serious nature; and (iii) continued pregnancy may threaten the life and safety of the pregnant woman or seriously impair her health. ■

Human cloning is Dolly's debatable offspring

◆ David Dickson

The dawning possibilities of human cloning raise unprecedented ethical and political dilemmas. Nowhere is the debate more intensive than in Britain, where the cloned sheep Dolly was created using a revolutionary technique.

In February 1997, when British scientist Ian Wilmut and his colleagues at the Roslin Institute outside Edinburgh announced that they had successfully cloned a sheep, Dolly, the news set off a global wave of concern about the possibilities of human cloning. In contrast, the reaction of government officials in Britain was one of satisfaction—bordering perhaps on complacency—that adequate preparations had already been made to address the full implications of cloning research.

As political leaders across the world spoke sternly of the need for an immediate global moratorium on such research, Britain was able to point out that human cloning—the creation of humans copied from other humans—was already banned under the Human Fertilization and Embryology Act, passed in 1990.

The 1990 Act does, however, allow research on human embryos up to 14 days old and in principle appeared to open the way for "therapeutic cloning"—the use of cloning techniques to develop a potential range of medical treatments such as organ and tissue replacement and repair.

But the mood changed in June this year, when the government refused to endorse a proposal from the respected regulatory body established by the act—the Human Fertilization and Embryology Authority—to allow amendments to the legislation which would formally allow research into therapeutic cloning. The government said it needed more time to study the ethical implications of such amendments.

For Britain, the political dilemma is particularly acute. On the one hand, the cloning techniques developed by Wilmut and his colleagues have been hailed as a major scientific breakthrough whose broad potential medical applications promise to provide a major boost to the British economy, for example through licensing to companies across the world.

But with trust in government scientists already deeply scarred by the experience of bovine spongiform encephalopathy (BSE, informally known as Mad Cow Disease), and further dented by concern over the potential health and environmental dangers of genetically modified crops, the government appeared reluctant to take further risks to its credibility by giving rapid approval to another "revolutionary" and controversial technology.

Copies of pop stars

There are few who would endorse the use of cloning technology to produce replica human beings to order. It is therapeutic cloning, with its enormous potential medical applications to humans, that is at the centre of most current controversy.

One possible application of therapeutic cloning could be the treatment of women whose mitochondrial DNA—the genetic material that provides energy to the cell—is damaged, and therefore risks passing this defect on to their children. Another is the ability to grow and graft skin in this way, which would replace the need for the current practice of using skin taken from another part of a patient's body. The same technique could be used to replace damaged bone or liver cells.

The problem, of course, is that the word cloning remains highly emotive, creating, as it does, visions of rich pop stars or autocratic dictators ordering up multiple copies of themselves. Critics argue that cloning represents the ultimate "instrumentalization" of a human being: treating one individual primarily as the means to gratify another, not as an end in himself or herself. They also argue that any attempt to

◆ News editor of the international science journal Nature, and author of The New Politics of Science (University of Chicago Press, 1988)

distinguish between "reproductive cloning" and "therapeutic cloning" is largely semantic, and that giving the green light to the second will inevitably lead to the first.

But the distinction is seen as critical for those keen to realize the full medical potential of the cloning techniques. Among them is Wilmut himself, who has spent much of the past two and a half years talking about both the threats and the promises that his work has opened up, and now works as chief scientific officer for Geron Bio-Med, a company set up earlier this year jointly by the Roslin Institute and a U.S. biotechnology company, Geron, to exploit the potential of his work.

For Wilmut, like many others, the ethical threats of human cloning involve sensitive issues of human identity and social relationships, particularly within the family. "We can all imagine the type of issues that would arise if a cloned child were born into our own family," he says. "Just think, for example, of the difficulties for a child who fails to meet the expectations of its parents, which is quite likely given that personality is only partly the result of our genetic inheritance." But he also insists that the promises of cloning techniques, if responsibly used, remain enormous. "There is a large potential here for providing more effective treatment for a range of diseases, such as Parkinson's Disease, that are associated with damaged cells that do not have the ability to reproduce themselves." He acknowledges that the ethical dilemmas are difficult, adding: "We are keen to take part in any discussion that addresses them."

'We can all imagine the type of issues that would arise if a cloned child were born into our own family. Just think, for example, of the difficulties for a child who fails to meet the expectations of its parents, which is quite likely given that personality is only partly the result of our genetic inheritance.'

But attempts to win acceptance for therapeutic cloning research in the political arena have proved fraught with obstacles, primarily stemming from the political strength of anti-abortion groups, who remain deeply opposed to all forms of cloning.

This, for example, has already been the fate of attempts by the Clinton administration to introduce legislation in the United States that would simultaneously outlaw reproductive cloning while allowing embryo cloning for therapeutic purposes.

Sensitivities in the U.S. are high. Earlier this year, the National Institutes of Health announced that, despite being subject to a congressional ban on the use of federal funds for research on embryos, it had decided to sponsor work on stem cells obtained from embryos provided by the private sector, e.g., left over from fertility treatments. (Stem cells are undifferentiated cells from which specialized cells such as blood cells develop.) But congress is now moving to close this loophole.

The perspective of U.S. critics is close to that which has dominated legislative debates in mainland Europe—in particular in France and Germany—with its heavy emphasis on potential threats to human "dignity". Indeed it is this approach, combined with the view that human life begins at conception, that has led most European countries to ban not only attempts at human cloning, but all forms of embryo research.

'A moral black hole'

In contrast, the official British (and American) approach has, up to now, been more pragmatic, seeing the potential dangers of human cloning primarily in terms of the possible medical risks, such as uncertainty over long-term complications. But the UK government's new announcement appears to reflect an increased willingness to accept that other more explicitly "ethical" factors need to be taken into account.

This acknowledgment was immediately welcomed by religious lobby groups such as Christian Action Research and Education, whose director, Charles Colchester, was quoted in the London *Times* as urging the government to ensure that a new review body set up by the government to investigate human cloning techniques should consider what he described as the "gaping moral black hole" in such scientific research.

But this suggestion was widely criticized by researchers in the field. Robert Winston, for example, professor of fertility studies at the Royal Postgraduate Medical School in London, warned that many of Britain's "best scientists" may be tempted to leave the country to carry on their work if the government does not back down. "By confusing the cloning argument, the government is in danger of impeding one of the most significant medical advances of the decade," he said.

There was also criticism from those keen to see cloning techniques developed as a commercial activity. "British science is currently at the forefront of this emerging field," says John Sime, the chief executive of the Bioindustry Association, the professional organization for the UK biotechnology industry. "But it is a competitive one in which much is at stake, both for patients and the economy."

Some remain optimistic that research will receive the green light. "If the promises that have been made for these new techniques, in terms of the potential for treating degenerative diseases, are even half true, it would be immoral not to go ahead with the research," says Juliet Tizzard of the Progress Educational Trust, a group that lobbies in favour of research on reproductive technologies.

But this conclusion is far from assured, and the debate is far from over. The prospect of being able to produce identical copies of adult humans continues to hold enough fascination for some—and to be sufficiently distasteful for others—to ensure that, whatever the potential medical benefits from the less dramatic aspects of cloning research, its supporters face a difficult task in getting permission to proceed. ■

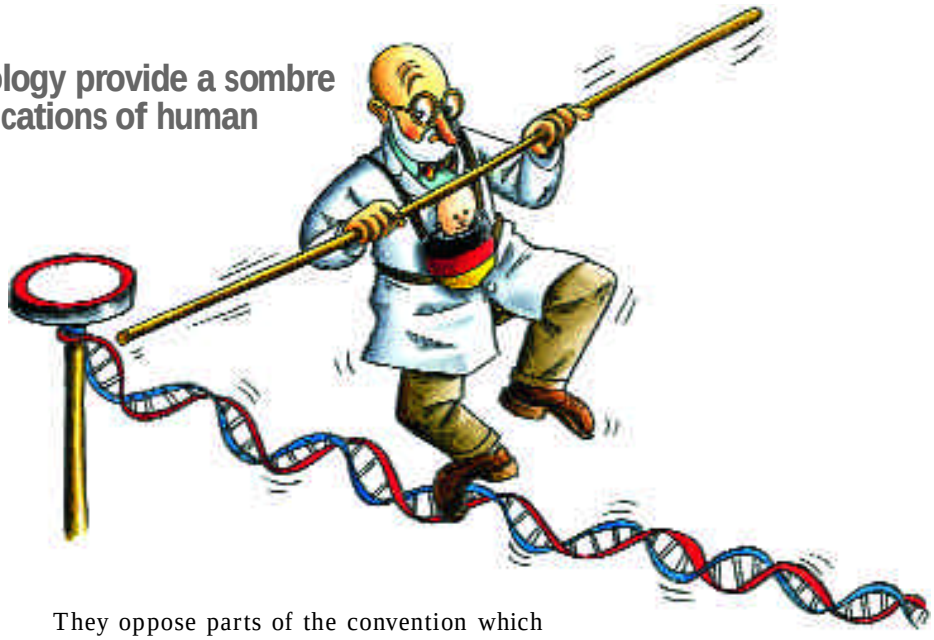
Because of heredity, our lives are actually as full of cabbalistic signs and spells as if sorcery really did exist.

Marcel Proust, French writer (1871-1922)

Germany: the dark shadow of the past

◆ Hartmut Wewetzer

Memories of the Nazis' eugenics ideology provide a sombre backcloth to German debate on applications of human genome research



Germans tread very delicately in the field of bioethics. When the birth a cloned sheep called Dolly was announced in 1997, it set off wild speculation in the media. The idea of cloning humans was immediately dubbed immoral and set off a barrage of condemnation from many politicians, scientists, church officials and environmentalists. It had already been formally banned by a 1990 German law protecting embryos.

Why is there such near-unanimous agreement about this and why are people so touchy when it comes to discussing biology, medicine and ethics? Why is Germany so far behind in what bioethicist Ludger Honnefelder calls its "ability to think and judge" in these matters?

We have to remember the horrors perpetrated by the Nazis in the name of eugenics. These pseudo-scientific theories developed in the 1930s, and from 1939 on they were used to justify, among other things, the extermination of Jews, handicapped people (100,000 of whom were subjected to "euthanasia" in the space of five years) and gypsies.

In the name of science and "the master race", doctors and geneticists performed horrific experiments on human guinea pigs. "The whole subject was taboo among German scientists until the early 1980s," says Benno Müller-Hill, a geneticist at Cologne University who published a book in 1984 called "Mortal Science".

"We can't walk past this ocean of blood and continue on our way as if nothing had happened," he says. Especially as modern genetics may spawn new kinds of "scientific racism". It could lead, he speculates, to a link being made between genes governing certain character traits, such as aggression, and membership of an ethnic group, which would encourage discrimination.

Germany's National-Socialist past also weighs on the Council of Europe's Convention on Human Rights and Biomedicine, which Germany refuses to sign. Many politicians, religious believers, environmentalists and associations of handicapped people say it isn't tough enough. They agree with the Catholic Social Democrat Robert Antretter, who fears "a resurgence of disregard for human life as it was applied during the Nazi era."

They oppose parts of the convention which allow research to be done, in certain circumstances, on human subjects who cannot give reasoned consent (mainly children and the handicapped). They also deplore the fact that it does not ban experiments on embryos, as in Germany. Opposition to the convention is growing in the German parliament.

'We enjoy disaster scenarios'

Only prenatal examinations seem to escape the general criticism. The churches do not strongly oppose this practice. Wolf-Michael Catenhusen, a Social Democrat and Secretary of State for research in the present government, says it is important that the people involved should be able to decide whether or not to bring a handicapped child into the world. "We musn't forget," he says, "that in more than 90 per cent of cases such examinations prove parents' fears to be groundless."

The "historic" suspicion of genetics does not seem to have lessened since the coalition government of Social Democrats and Greens took office in 1998. The Greens are critical of modern medicine and science. "Progress in biomedicine calls into question our concept of what it means to be human," says Monika Knoche, the Greens' health expert.

German scientists and industrialists stress that the country must not get left behind by its foreign competitors in the field of the new technologies. "We enjoy disaster scenarios," former President Roman Herzog once said. "Nearly all discoveries raise many questions about the risks and dangers involved, but few about the opportunities they provide." ■

The life of science is that superficial life. It pursues success with skill and thoroughness, and takes no account of the higher nature of man.

Rabindranath Tagore, Indian poet (1861-1941)

◆ Journalist in Berlin (Germany)

Genes of inequality

◆ Mohamed Larbi Bouguerra

New drugs and treatments based on genetic research are set to widen existing disparities in access to medical treatment

Medicine in the 21st century is likely to be based on genetics. The decipherment of DNA being done as part of the international Human Genome Project will probably unleash a flood of applications which will make it possible to improve the physical condition of human beings at a time when many experts are saying the limits of "conventional" medical care have been reached.

Over the next two decades, gene therapy, immunology and cell culture enabling production of totally uncontaminated blood (for people with leukemia, for example) are expected to make great strides. The availability of a range of prenatal tests designed to spot genetic anomalies in embryos will boost the development of genetic counselling services.

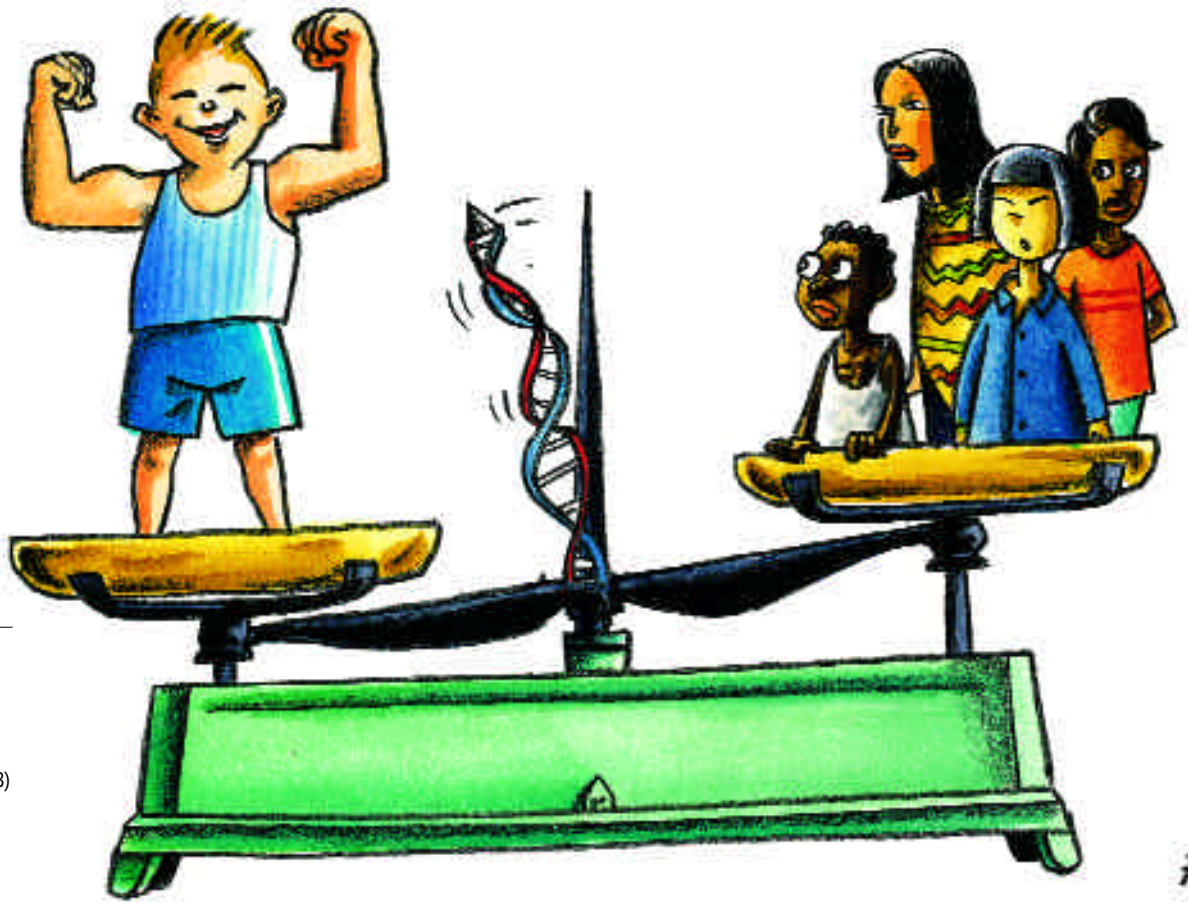
But who will benefit from all this? Right from the start of the Human Genome Project in 1990, James D. Watson, one of the discoverers of DNA's double helix structure, has campaigned for this great project to stay in the public domain. "The world's nations," he has said, "must realize that the human genome belongs to everybody on the planet and not to individual countries."

Most discoveries and new treatments have come out of laboratories in the rich countries, but people from countries of the South have also contributed their brain power and hard work. It was an Indonesian, Joe-Hin Tjio, who proved, in 1956 in Sweden, that human beings have 46 chromosomes. In 1968, in the United States, Indian Nobel Prize-winner Har Gobind Khorana became the first person to synthesize a human gene.

Lack of resources and political will

Analysis of the DNA of some indigenous peoples has yielded valuable genetic data for scientists who have subsequently declared discoveries made on the basis of it to be their own intellectual property. One such population study, for example, identified the genes of a man of the Hagahai tribe (Papua New Guinea) which provide immunity to the leukemia virus HTLV.

But owing to lack of resources and political will, many poor countries have trouble putting together a serious policy on science which would reduce their total dependence on rich countries ▶



◆ Former director of Tunisia's National Institute for Scientific and Technical Research and author of La Recherche contre le tiers monde ("Research against the Third World"; PUF, Paris, 1993) and La Pollution invisible ("Invisible Pollution"; PUF, Paris, 1997)

and enable them to work out research priorities. Some of these countries however have human expertise and facilities which allow them to contribute to work on DNA sequencing.

India, for example, has six laboratories where this can be done, all of them linked to the Hyderabad Centre for Cellular and Molecular Biology. Some Indian specialists would have preferred to sequence the DNA of pathological organisms (microbes, mosquitoes, contaminants,etc.) which are common in India, rather than that of human beings chosen at random. In this way, it would have been easier, they say, to develop applications that would be immediately useful to people in India. This is an ongoing debate because nobody can guarantee that analysis of the human genome will lead to medical treatment for people in the countries of the South, where there are fewer profits to be made than in the North.

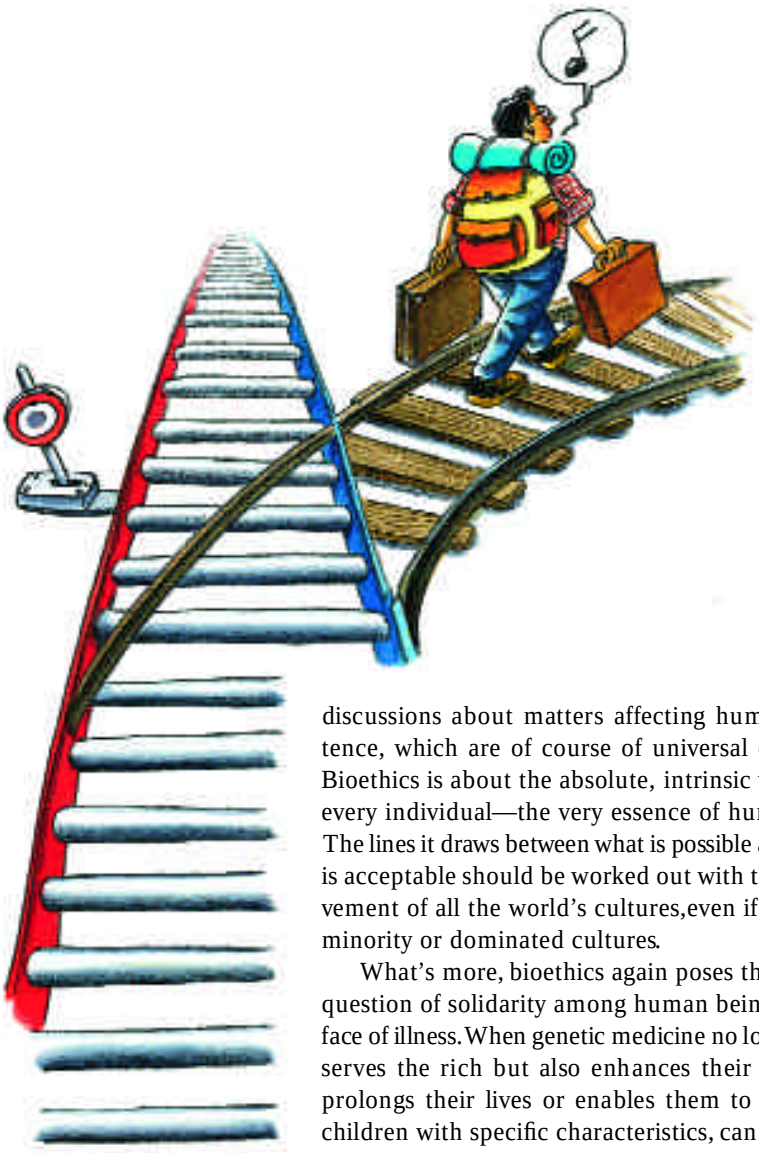
Light-years away from medecine's new horizons

The other big question is that of access to the new forms of treatment. Even in rich countries, where public spending on health is being cut, these therapies will be very expensive—at least to begin with—and are likely to trace a new frontier between the well-off and the rest of the population (see page 26). So it is not very likely that treatment of this kind will really reach the people of the third world. The countries of the South are also light-years away from the new horizons of medicine because they lack basic health facilities and trained health workers.

Should some countries, or even whole regions like Africa south of the Sahara, not be part of today's debate about bioethics just because they might be excluded from the benefits of tomorrow's medicine? The answer is no. First, because their inhabitants are sometimes directly involved. The elimination, for example, of some "harmful" genes through germ-line therapy—if it were ever applied on a world-wide scale—could be very harmful to them. In accordance with the phenomenon known as pleotropy, a single gene can control several characteristics. Thus the recessive gene of cystic fibrosis may play a part in fighting cholera.

Sickle-cell anaemia (an abnormal form of the red pigment of the blood, haemoglobin) affords some protection against the deadly form of the malaria parasite, *Plasmodium falciparum*. If the gene that triggers this condition is eliminated, do we risk seeing even more cases of malaria? This is a very gloomy prospect in a world where malaria is already killing two million people a year and when none of the big pharmaceutical companies have invested money to look for a vaccine. More generally, the whole planet is concerned by the risk of reducing the genetic reserves available to future generations by altering or eliminating certain genes. Is it not presumptuous and dangerous to anticipate their needs when nobody yet knows what kind of environment they will be living in?

No one on the planet should be excluded from discussions about matters affecting human existence, which are of course of universal concern. Bioethics is about the absolute, intrinsic worth of every individual—the very essence of human life. The lines it draws between what is possible and what is acceptable should be worked out with the involvement of all the world's cultures,even if they are minority or dominated cultures.



What's more, bioethics again poses the urgent question of solidarity among human beings in the face of illness. When genetic medicine no longer just serves the rich but also enhances their lifestyle, prolongs their lives or enables them to produce children with specific characteristics, can we deny the people of poor countries the benefits of knowledge which would free them from the scourge of debilitating parasitical diseases, of Aids and of hereditary afflictions? How long could such "medical apartheid" fail to affect the consciences of those living in the countries of the North? ■

A TREATY ON THE GENOME?

"In the framework of international co-operation, States should seek to encourage measures enabling: . . . the capacity of developing countries to carry out research on human biology and genetics, taking into consideration their specific problems, to be developed and strengthened . . . ; developing countries to benefit from the achievements of scientific and technological research so that their use in favour of economic and social progress can be to the benefit of all." Article 19 of the Universal Declaration on the Human Genome and Human Rights gives a new focus to "the rights of solidarity". The declaration,which is not legally binding, was adopted by the international community in 1997 after long negotiations within UNESCO's International Bioethics Committee (IBC).

The declaration also enshrines two major principles, explain Noëlle Lenoir, who chaired the IBC during the negotiations. First, rejection of biological determinism: human beings are not animals programmed by their genes. Second,a refusal to accept that genetics can provide justification for socially discriminatory or racist practices. "Human dignity" is the key expression in the text, which condemns reproductive cloning. This declaration adopted under UNESCO's auspices is today the only text of universal scope which specifically concerns bioethical issues. "But," Lenoir adds, "I feel that in the present context of globalization we should be moving towards a treaty," that signatory states would be bound to respect. Warning:turbulence ahead. ■

IS COPYRIGHT ON THE WRONG TRACK?

◆ Mireille Buydens

Efforts to strengthen intellectual property rights are posing a challenge to their original purpose–striking a balance between the protection of individual property and the public interest

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New Delhi, in a get-tough demonstration organized by software companies, an elephant tramples on pirated CDs.

What is the purpose of intellectual property rights? Originally they were based on the principle that creators should be granted exclusive rights to exploit their works, in order to ensure they were properly remunerated and, in addition, to encourage creative activity. But in the interest of the community and of future artists and inventors, those exclusive rights were limited in time:when the term of protection ran out, the works fell into the public domain, a copyright-free space that encourages creation and competition. They could then be used as raw material and a kind of "suggestion box" by fresh generations of creators. A balance between the protection of individual property and the general interest was guaranteed.

Today that balance has been destroyed. The founding principles of intellectual property seem to be threatened by an ill-considered increase in the number of privately held exclusive rights at the expense of the public domain.

Counterfeit software and designer clothes

The main factor hastening these developments is a change in the economy, which focuses increasingly on products with "intellectual added value", such as new software, the selection and presentation of information, specialized computer services, cultural and entertainment products,biotech products, and other applications of cutting-edge technologies. Control of ideas, forms, images and brands is a crucial element in this so-called "immaterial economy".

While it is difficult to steal a consignment of steel girders or a cargo of bananas, it is child's play to copy software or manufacture counterfeit designer clothes. It is easy for intellectual added value to be illicitly ▶

◆ Professor at the Catholic University of Louvain and a lawyer in Brussels, Belgium

appropriated: it cannot be "put under lock and key". Those who want to exploit it for their own profit simply need to be able to reproduce it. Pirates in this field can market copied products at a lower price than the originals, since they do not have to pay the cost of creating or advertising the product. By doing this, they distort competition.

International negotiations

To protect their industries against piracy and counterfeiting (see box), the member countries of GATT (General Agreement on Tariffs and Trade, which governed international trade from 1947 to 1994) set out to strengthen intellectual property rights within the GATT framework. GATT's main concern was to protect companies from unauthorized copying and unfair competition, thus ensuring they would get a return on their investment.

When GATT concluded its first agreements, intellectual property was not very high on the agenda. In the immediate postwar years, products put on the market still consisted of atoms of matter, not bytes. It was not until the Uruguay Round of talks started in 1986 that the issue came to be discussed at the international level. That round of talks resulted in the signing, on April 15 1994, of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Like the multilateral agreements on trade in goods, the text was included in an appendix to the Marrakesh framework agreement that set up GATT's successor, the World Trade Organization (WTO).

TRIPS, which has a global application (most countries in the world have now subscribed to it), confirmed the economic importance of intellectual property rights. It requires member states to protect all forms of creation: literary and artistic works in the broadest sense (including maps and press photos), computer programs, data bases, sound recordings, radio and television broadcasts, drawings and models, inventions of products and processes in every technological field, the lay-out designs of integrated circuits, and so on.

The agreement was a milestone in the history of intellectual property. First, its scope of application is unprecedentedly wide: anything created in the fields of technology, software, news or culture can and must be protected by an intellectual property right, in such a way that it exclusively benefits rights holders, who alone decide how it should be reproduced and distributed. Secondly, for the first time TRIPS requires contracting states to organize procedures and sanctions that enable rights holders to ensure that their rights are respected. Those states are for example obliged to allow persons or companies whose rights have been infringed upon to go to court and obtain damages. Such duties are chiefly incumbent upon the developing countries. Most of these countries do not possess the human or financial resources that would enable them to develop their own production, and they have tended to become the preferred locations of the copying industries.

Pirates can market copied products at far lower prices than the originals, since they don't have to pay the cost of creating or advertising the product. By doing this, they distort competition

In this general move towards comprehensive protection of products with intellectual added value, the European Union has not lagged behind. In the course of the past 10 years, it has been very active in introducing new legislation. According to the directive of May 14, 1991, computer programs are protected by copyright at European Union level. Similarly, the definition of copyright content has been tightened, particularly as regards the copyright of works put on the Internet. In this connection, a proposed directive on "the harmonization of certain aspects of copyright and neighbouring rights in the information society" was examined by the European Parliament on February 10, 1999, with a view to its adoption. The directive contains provisions for authors or their rights holders to control the distribution of their works on the Net or to forbid it. Any copy of their sound or visual works available online will entitle them to financial compensation, even if the copy is made solely for strictly private use.

A new right to protect investment

The protection of data bases by copyright has also been confirmed. For the first time in the European Union, it was even extended to their contents by a directive of March 11 1996. Until then, it had been accepted that a compilation of data possessing the characteristics of an original creation could be protected by copyright. But this protection covered only the selection and arrangement of the data, in other words the structure or container of the base, not its content. The raw data, on the other hand, were not covered by copyright and could therefore be used by anyone. On this occasion, the European legislator stressed that data collection could, irrespective of the creation of the data base's architecture, represent a substantial investment. He concluded that the content of the data base should also be protected. Clearly departing from the traditional rules governing intellectual property, which in theory concern creative contributions alone (products with intellectual added value), he established a new right designed to protect financial investment. Those who make a "substantial" investment are provided, de facto, with an exclusive right to the bene-

THE COUNTERFEITING INDUSTRY

According to Peter Lowe of the Counterfeiting Intelligence Bureau (CIB), a London-based organization that reports to the International Chamber of Commerce, counterfeiting is a "multi-billion-dollar industry". The CIB puts its global turnover at $250 billion. "It is estimated that it accounts for 5-8 per cent of world trade," says Lowe. The most commonly counterfeited products are software programs, CDs, CD-Roms, videocassettes, watches and designer clothes.

In the United States, the copyright industries alone (essentially the cinema, television, publishing, record companies, and manufacturers of software and video games) lost $12.4 billion as a result of piracy in 1998, according to the International Intellectual Property Alliance (IIPA). This group of commercial bodies that are campaigning for stronger protection of intellectual property includes 1,350 American companies. According to its president, Eric Smith, "copyright industries are growing very fast worldwide". In the United States, they account for about 3.65 per cent of GNP. In 1996, they became the country's main export, ahead of automobiles, agri-foodstuffs and aerospace. ■

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Los Angeles, 1996: a police raid on a T-shirt store selling counterfeit clothing.

fits of their investment, even if there has been no intellectual creation.

Financial interests again have now prompted the European legislator to consider the adoption of a directive on the protection of biotechnological inventions. The move was motivated by two factors: first, "the protection of biotechnological inventions will certainly be of key importance for the Community's industrial development"; secondly, "research and development, notably in the field of genetic engineering, require a considerable degree of high-risk investment which cannot be profitable unless there is adequate legal protection".

Financial terminology—talk of profitability and an attractive "return on investment"—is invading the sphere of intellectual property. The notion of intellectual property used to be a way of protecting intellectual added value; it has now become an instrument for turning invested capital to good account. Is this a necessity or is it regrettable? The question is worth debating.

It is true that in the field of biotechnology, for example, creation requires considerable investment. This is something that industrial companies cannot accept unless they are sure of being able to make it at least partially profitable. On the other hand, one may reasonably wonder whether there is any point in creating a new monopoly on information contained in data bases, even if a great deal of time and money has gone into creating them. The idea here is not to reward an intellectual creation, however slight, but merely to repay an investment in time and money. This trend could well jeopardize the sharing of knowledge. The notion of intellectual property here seems to have departed from its basic purpose, which was to ensure a balance between private and public interests.

This change of direction is one of the first perverse effects of the exponential increase in the amount of space occupied by intellectual property. More fundamentally, it has been engineered by a society that tends to make legal and material protection the keystone of its ethos: all property and anything else of value needs to be protected against risk. Accident prevention, security, insurance and protection have become mantras in developed Western societies. It has reached the point where those societies sometimes seem to have forgotten that risk is an inherent aspect of life and freedom.

Research and development, notably in genetic engineering, require a considerable amount of high-risk investment which cannot be profitable unless there is adequate legal protection

The second perverse effect of the boom in intellectual property—the broadening of its scope as well as of its duration—is equally worrying. In 1993, for example, the duration of copyright in the European Union was increased from 50 to 70 years after the author's death.

On many occasions over the last ten years, legislators and courts have also agreed to an unlimited extension of the scope of copyright protection. Originally designed to protect works of art, copyright has been extended to cover every sphere of human creation, from the design of car bodywork or ties, meteorological photographs and the instruction manuals of electrical household appliances to data bases and recipes. Since everything belongs to someone, an authorization from the owner is required for everything. In practice it has become extremely difficult to create a multimedia work, to shoot a film, to compose a piece of music, or to publish an illustrated book without in some way having to use elements that are protected by copyright, and therefore having to request a detailed authorization from copyright holders and to pay them financial compensation.

In the short term, this increase in the number of exclusive rights will be a threat to economic activity itself. Competition, after all, boils down to offering the same product as someone else. Now if that product and all its variants, versions and components are protected by intellectual copyright, copying—in other words, making a competing offer—becomes an extremely hazardous exercise. If limited exclusive rights, which used to form part of the original spirit of intellectual property, protect companies against illicit copying, disproportionate exclusive rights quite simply wipe out competition altogether.

As for the extension of the duration of copyright, it means that the community's right to make free use of a work after it has fallen into the public domain will be a theoretical possibility rather than a fact. The present duration of copyright protection often exceeds the period during which the created work is in fact usable. After 70 years or more, an old computer program is of no use to anyone.

Similarly, the European directive on data bases theoretically restricts their protection period to 15 years. But it stipulates that if a data base is modified, notably by a large number of additions, deletions or changes which show there has been substantial further investment, the duration can be extended by 15 years. Thus, a regularly updated data base can be protected for ever and will therefore never fall out of copyright. That contravenes the most fundamental principles that underlay the notion of intellectual property rights. ■

CARTHAGE'S LONG-AWAITED RESCUE

◆ Sophie Bessis

Despite 30 years of protection, the site of the great city of Antiquity is still being eroded by urban pressures. A major conservation project now in the works should pave the way for new excavations

Imagine an urban area whose population has increased from 300,000 to nearly two million in 40 years. It sprawls out in every direction and its growth seems unstoppable. This is the case of Tunis, which has even started filling in some of the salt lakes on its periphery and building modern neighbourhoods on the reclaimed land.

As you go north of the capital, past the big port of La Goulette and the old suburb of Kram, you suddenly come upon a vast expanse of meadowland, green in winter and yellow in summer, that is dotted with the remains of walls, heaps of stones and the stumps of still-gleaming marble columns. These are the outskirts of Carthage, in Antiquity the prosperous capital of the Roman province of Africa.

Towards the sea, the landscape is again dominated by buildings, forming an immense garden city interspersed with the splendid ruins of the ancient city. Its suburbs stretch further north as far as ancient Megara, overlooked from a height by the village of Sidi Bou Saïd, whose white domes have for centuries stood out between the sea and the sky.

Unexcavated remains

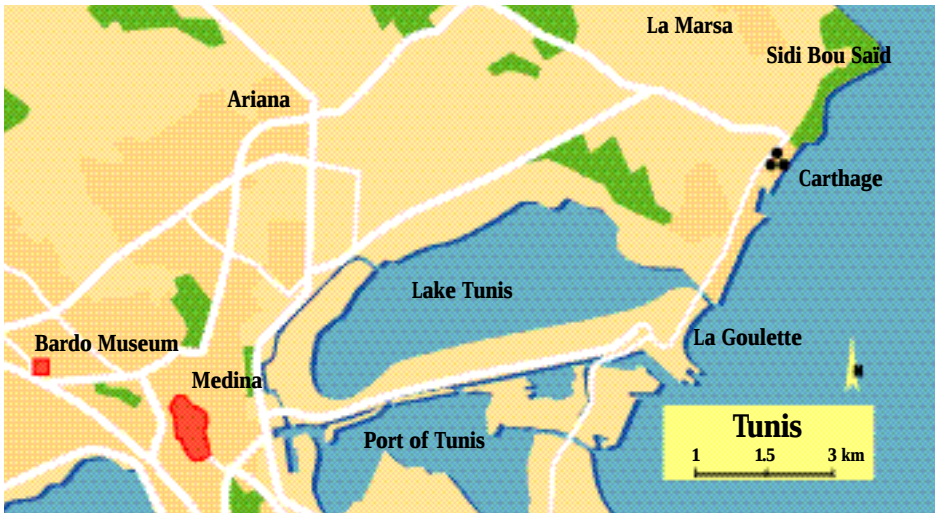
Carthage, a city both mythical and real, was founded in the 9th century B.C. by the legendary Queen Dido (also known as Elissa), who hailed from Phoenicia. It became the Mediterranean's most formidable maritime trading power until the rise of the Roman Empire, which destroyed it in 146 B.C. Its fortunes then revived under the Romans. Only ruins are left of the Phoenician city, but the remains of Roman and Byzantine Carthage are more abundant and give a good idea of what one of the biggest cities of ancient times was like. But a large part of the old city is still buried and, if steps are not taken, may stay hidden forever.

To get an idea of the threats that hang over ancient Carthage, you have to climb atop the hill of Byrsa, which was the site of a Phoenician fortress and then the Roman forum. Today the hill is occupied by the St Louis basilica, which was built in early colonial times, and the former archbishop's palace, now a museum. From here, you can see over the entire plain of Tunis. Nearly all the narrow coastal strip between the lake and the sea is built up. Teeming slums fill the southern end of the strip. Further north, between Carthage and the seaside resort of Marsa, are chic residential suburbs where every rich or politically powerful Tunisian dreams of living.

Carthage, which was supplanted by Tunis more than a thousand years ago, seems to have become once more a symbolic place of power since Habib Bourguiba, independent Tunisia's first president, established the presidential palace there. The urban pressure seems inexorable, whether from the poorer areas or from the zone of luxurious villas which look on to them. Tunis has no more room to expand and is greedily eyeing a 500-hectare area which has been set aside as a future archaeological park. The site of Carthage has been protected for the past 30 years, and new building has been virtually halted. Urbanization began at the end of the last century, with the construction of the railway from Tunis to La Goulette and Marsa. Under the French protectorate, villas and housing estates began encroaching on the area. After independence in 1956, this creeping expansion accelerated dramatically. The city grew in size because of population growth and an exodus from rural areas. A new government-fostered middle class sharpened appetites for land and property speculation. Concrete spread like a lava flow.

A rescue operation

In the early 1970s, awareness began to spread, both in Tunisia and abroad, that the remains of Carthage were in danger of disappearing forever. On May 19, 1972, UNESCO Director-General René Maheu launched an international campaign to save the site, which was put on UNESCO's World Heritage List in 1979. Rescue operations soon began. As a dozen teams of archaeologists from several countries got to work, the Tunisian government took



◆ Freelance journalist

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An upmarket residential area around the port of Phoenician Carthage.

steps which led in 1985 to the declaration of a 600-hectare zone of Carthage and Sidi Bou Saïd as a protected area where new construction was mostly banned.

Heritage campaigners breathed a sigh of relief. But if the worst has been avoided over the past 15 years, threats still loom. The fight to save Carthage has been conducted at various levels. It aims to halt the spread of poor housing as well as to curb the appetite of the wealthy who are determined to put up buildings and of businessmen who want to promote housing development in a zone where land values are the highest in the country. There is little sympathy for the moratorium on such development. Why, people ask, should a building project, which is either necessary or profitable, be banned just to preserve past history which only interests an educated minority of Tunisians?

Over the years, six orders have cut back the area of the future archaeological park planned in 1985. Two zones were reclassified as part of the urban area and were quickly built on, while luxury villas have sprouted around the famous Phoenician ports. Some land has been given to the Polytechnic Institute to expand its campus. Squatting by poor people in the Ellil district on the edge of Carthage has also been allowed.

These encroachments on the protected zone are worrying but not alarming, according to one expert, and so far the core of the site has been preserved. But the pressures are so strong today that tougher laws are now needed as well as the creation of the long-awaited Carthage-Sidi Bou Saïd archaeological park, whose physical existence would finally put an end to such pressures.

Things are moving along slowly. Since 1991, a cabinet committee chaired by President Zine El Abidine Ben Ali has overseen the Carthage project, for which the president has always expressed strong support. Officials are working on a preservation and development plan for the park which is expected to be much more detailed and restrictive than the 1985 preservation order. It will authorize public expropriation of any part of the site, enabling the government to buy the land, most of it still privately-owned. It will ban division of plots of land and the building of housing estates and, with the 1994 Heritage Code, will complete the country's set of preservation laws.

After independence in 1956, urban expansion accelerated dramatically. The population increased, and a new middle class sharpened its appetite for land and property. Concrete spread like a lava flow

UNESCO dispatched a team of experts to Tunis in March 1999 to take a look at the plan. They reported that it was "useful and coherent", though it "risked setting off conflicts, mainly with landowners . . . but also for other reasons, including financial ones." The state, they said, "should make a substantial investment to gain control of the land by buying it."

So all the obstacles have not yet been overcome, but if the determination of the politicians holds, the preservation plan should come into effect before the year 2000. To mark the occasion and also launch a new series of excavations, the Tunisian authorities want to stage an international conference on Carthage in January 2000.

By making the establishment of the park irreversible, Tunisia will be the only Mediterranean country to have protected 600 hectares of land in the centre of its biggest urban area. Tunis will be the only Mediterranean city with a park of such size and with such a rich history. For the past 30 years, friends and admirers of Carthage have been fighting to make this great dream come true. So far the battle has not been lost—but it has yet to be won. ■

TUG-OF-WAR IN BEIRUT AND CAIRO

◆ Sophie Boukhari

The defence of archaeological treasures in the Lebanese and Egyptian capitals has triggered epic battles and led to mixed results

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Greater Cairo's tentacular growth reaches out to the pyramids.

© Daher/Gamma, Paris

Development and rebuilding in central Beirut have given short shrift to archaeological remains.

The efforts to safeguard Carthage and the nearby village of Sidi Bou Said (see page 40) are particularly noteworthy because ancient remains in two other Arab capitals have not always enjoyed the same good fortune.

In Cairo, the pyramids have had a narrow escape. "I don't think anything can harm them now," says Zahi Hawwas, the energetic head of the Giza archaeological zone. In 1995, however, this UNESCO World Heritage site, which contains the last of the Seven Wonders of the World that can still be seen, was nearly cut in two by the greater Cairo ring road being built to decongest the city of 15 million or so inhabitants. After a campaign led by UNESCO and helped by the media, Egyptian President Hosni Mubarak came down on the side of heritage.

As a result, the eight-lane ring road has not been paved for the four kilometres that were supposed to cross the Giza Plateau, but the rubble is still there and the route has been handy for truck drivers who use it as a short cut. "I ordered this traffic to stop at the beginning of June," says an annoyed Hawwas, who wants the government to build a detour that avoids the site.

"We asked for the road foundations to be destroyed but that wasn't done, so I fear the plan to use the route isn't completely dead," says Said Zulficar, a former UNESCO official who fought against the ring road and is now secretary-general of the French NGO Patrimoine sans Frontières (Heritage Without Borders).

He deplores the fact that another part of Cairo, the protected site of Fustat, the first city founded by the Muslim conquerors in the 7th century, is being harmed by "rampant urban expansion". The authorities, he says, "have built social housing and an amusement park right in the middle of the town when it hasn't even been excavated by archaeologists.

"In Egypt, there are laws and officials but there are also people more powerful than the laws, along with a lot of speculators," says Zulficar, hinting at the weakness of the state's Higher Council for Antiquities in the face of big construction firms headed by people in the inner circles of power.

This is something the inhabitants of Beirut know all about. After the recent civil war, Lebanese archaeologists had an unexpected chance to explore and display the precious bowels of the city centre which had been exposed by bombing. But the area "was cleared by bulldozers and dynamite as part of a huge urban renewal project," says Lebanese architect and town planner Jade Tabet. The main shareholder of Solidere, the company doing the clearance work, was wealthy former prime minister (1993-1998) Rafik Hariri, who is now in disgrace.

This meant that a blueprint making the city into a kind of Manhattan on the Mediterranean was forced on the centre of the Lebanese capital "even before archaeologists could start digging," says Leila Badre, the respected curator of the Museum of the American University of Beirut. "From that point on, the die was cast—badly—and we realized that the importance of the archaeological remains was going to be played down."

Excavations sponsored by UNESCO between 1993 and 1995 uncovered some very valuable remains, notably the ancient "tell" or mound which was evidence of the city's Phoenician origins. In 1996, the government even ordered three sites to be preserved, but the order was never carried out. "If we don't take action quickly, the remains will be damaged," warns Badre.

Who can do this? Solidere or the Directorate General of Antiquities? Solidere is going through a bad patch, and in April 1999 the head of the Directorate General and half of his aides were thrown in prison for embezzlement.

"It's a mess," says Tabet. "We should have based the plan for the new centre of the city on sites that could have become centres of attraction. But just try persuading someone who only thinks in cash-flow terms that archaeology can create added value! All the developers see are square metres of space to be built on as fast as possible. So some remains have been dumped in the sea, others are crumbling into dust and Solidere's 'dazzling' project is in the doldrums. It's dreadful to see the 3,000-year history of a city sold down the river." ■

◆ *UNESCO Courier* journalist

THE DARKER SIDE OF THE NET

◆ Cynthia Guttman

To combat child pornography on the Net, there is a strong consensus that governments, law enforcement, industry and users each have a role to play

The most cunning criminals have always sought to outsmart police, and cyberspace is no exception. The virtual, borderless universe frequented by some 130 million netizens provides the detective writer with every ingredient for a labyrinthine thriller: an anonymous interface, characters miles apart adopting nicknames and fake addresses, sometimes disguising their identities to entice a victim into a real-life meeting, or sending encrypted materials that are just about impossible for outsiders to decode.

It could be a thriller, except when the material being traded is child pornography and the people enticed are under-age. Images range from innocent photographs of young children with neutral or smiling expressions to extreme cases: in 1996, members of the Orchid Club chat room (see glossary) used a digital camera connected to a computer to photograph a 10-year-old child posing in a sexually explicit manner. The pictures were transmitted to other online ring members who made requests for the girl to pose in other positions. The ring was an international one, and its members were arrested in several countries.

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In Chicago, DeNashatae Horton shows her mother and sister some of the tools developed on its web site by the Ameritech company to help parents and children surf the Internet safely.

Innocence in danger

As the online population grows, countries and organizations are stepping up efforts to curtail child pornography on the Internet. By the medium's very nature, the venture is international. In April 1999 UNESCO launched its *Innocence in Danger* movement that aims to sensitize public opinion to child pornography on the Internet and mobilize resources to make the Net safer for children. In May, a victory was scored when Japan, one of the largest producers of child porn material, passed a law banning its production and distribution. In September, top European and American judicial and police officials, along with industry representatives and NGOs, are meeting in Austria to discuss strategies for reinforcing co-operation in the field.

◆ *UNESCO Courier* journalist

Just how pervasive is child pornography on the Net? In researching her forthcoming book, *A Parents' Guide to Protecting Children in Cyberspace*, Parry Aftab, an American cyberspace lawyer and former director of Cyberangels, the largest U.S. online safety and education programme, compiled a list of 30,000 sites relating to child abuse or paedophilia, out of an estimated total of 4.3 million sites. Looking more closely at newsgroups (see glossary), Rachel O'Connell, a psychologist from the University of Cork (Ireland) who is co-ordinating a European research project (COPINE) on the issue, found that child pornography amounted to 0.07 per cent of around 40,000 newsgroups worldwide. According to Ruth Dixon, manager of a British hotline run by the Internet Watch Foundation, the worst material is concentrated in some 20 newsgroups. Trading child pornography, however, is just one face of the coin, the other is the danger of children entering online chat groups with the intention of making friends or sharing interests, and ending up face-to-face with a person who turns out to be much older than claimed and seeking a sexual encounter.

One of the greatest concerns is that the Internet has made child pornography more visible and accessible, giving paedophiles the sense of being connected to a community of like-minded individuals. According to O'Connell, "one of the most significant factors influencing the growth of child pornography on the Internet is the ease of dissemination and collection. Anonymity and convenience have revealed an extraordinary level of sexual interest in children. Presumably, this interest was either dormant or latent on this scale in the past." As Martine Brousse, head of the French NGO Voix de l'Enfant, puts it, "the person who might not have gone through the process of buying ▶

a particular magazine to nurture his fantasies can now just go on the Net, it's not difficult." In newsgroups devoted to child porn, users typically recount claimed experiences and fantasies to each other and exchange pictures, sometimes by the hundreds. O'Connell has found that they tend to be a fairly cohesive and well-structured community, and provide advice to each other on how to avoid detection. Money rarely comes into the equation.

Legal loopholes

There is nothing illegal about exchanging fantasies. What is illegal in most countries—but not in all—is the production and distribution of child pornography. This can make it difficult for authorities to take action at the source, where materials are being uploaded. Nor is the possession of child pornography a criminal offence everywhere. The definition of a child's legal age varies from one country to another, and so does the definition of indecency. And while the majority of users are based in developed countries, NGOs such as Casa Alianza and ECPAT (End Child Prostitution, Child Pornography and Trafficking of Children for Sexual Purposes), express concern that child sex tourism is being promoted via Internet, putting children at further risk of not only being abused but having their photographs taken and transmitted online from countries where rules relating to child pornography are lax or non-existent. Faced with these loopholes, police, NGOs, judicial authorities and law enforcement are pressing for national legislations to be better harmonized.

Since the mid-1990s, police forces in a number of countries have set up units specialized in tracking down online child pornography. In Britain, Scotland Yard's paedophilia unit started to take the Net seriously when investigations led to the seizure of computer hard drives containing child pornography images. The U.S. Federal Bureau of Investigation (FBI) launched an undercover operation dubbed *Innocent Images* in 1994 to target people trading in child porn or expressing an interest in travelling inter-state with the intention of having sex with minors. "We pretty much have this down to a fine tuned science," explains veteran FBI agent Peter Gulotta. "Typically, most of our work involves going into chat rooms that we have reason to believe are involved in child pornography. We pose as adults willing to trade in child porn or as a young boy or a young girl. In a very short period of time, a predator will engage us in a conversation about our sexual activity. Some will very quickly express a willingness to actually travel to meet us." This technique has led, since 1995, to 357 arrests, with a 99 per cent conviction rate.

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On October 20, 1996, more than 300,000 people took part in a "white march" in Brussels (Belgium) to demonstrate solidarity with the victims of paedophiles.

Not all countries have the resources, skills and legal right to intervene in this way. An international convention on cyberspace crime is currently in the works, with a particular focus on procedural problems such as collecting evidence in a crossborder electronic environment. "Internet, insofar as crimes against children go, calls into question the entire way in which police forces work," says Agnès Fournier de Saint Maur, chief of specialized crime at Interpol. "We have to envisage legislative changes that take this into account, because without laws, police can do absolutely nothing. We also need additional resources to equip police forces with the right tools." Jim Reynolds, former chief inspector of Scotland Yard's paedophilia unit, regrets that not all countries have specialized units or identified points of contact to whom intelligence on paedophiles can be passed on. There are complaints of reports being sent from one country to another and not being acted upon for months.

'Internet, insofar as crimes against children go, calls into question the entire way in which police forces work. We have to envisage legislative changes that take this into account, because without laws, police can do absolutely nothing'

What is far from clear is the relationship between viewing child pornography and sexually abusing a child, even though an image is already the reflection of an abuse. "Child pornography is a far more serious issue that merely talking about photographs, it is the actual visual depiction of the sexual assault of a child," stresses Reynolds. "The circulation of these photographs revictimizes the child." According to French psychiatrist Bernard Cordier, the Internet can reinforce a paedophile's tendencies and increase the risks of committing an offence should a particular set of circumstances allow it. What concerns Gulotta is that most people arrested have no prior records, but investigations, which include examining materials on computer software and disks, have on some occasions revealed previous sexual encounters with children. When pictures are seized, the first priority of law enforcement is to determine how recent they are in order to reach children who might be at risk now. In conjunction with police forces in several countries, the COPINE project has constructed a database of seized child pornographic videos and pictures traded via the Internet. These images lend themselves to crime scene analysis, providing clues as to the picture's origins and facilitating co-operation, since the same pictures may be reported to police in different countries.

Partly in response to demand from the police and the public, industry has started to come forward. "Pressure on them has been extremely strong," says Saint Maur. "From the very beginning, everyone, including the police, put the blame on them. But just as you can't blame the postal service for shipping porn videos, it's rather difficult to really point the finger at Internet Service Providers (ISPs, see glossary). Nonetheless, this pressure has led ISPs to co-operate with police. For them, it's out of the question that they should do the policing." The bottom line is that without the technical expertise of industry and its willingess to pass on information to the police, the fight against illegal content will be ineffective. Police raids on ISPs in Germany have led to an uneasy relationship between industry and law enforcement bodies. "Law enforcement in and of itself is not a solution, it has to be part of a broader framework that includes the taking of responsibility by the industry itself," says Jens Waltermann of the Bertelsmann Foundation, which designs and supports projects in a wide number of fields. At its Internet Content Summit being held

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- **www.unesco.org/webworld/innocence**
- **www.casa-alianza.org**
- **www.childnet-int.org**
- **www.cyberangels.org**
- **www.ecpat.net**
- **www.fbi.gov/library/pguide**
- **www.info.fundp.ac.be/~mapi/plan.html** The Belgian Movement Against Paedophilia on Internet has published a comprehensive report on the issue.
- **www.iwf.org.uk** The British Internet Watch Foundation is considered one of the most effective attempts at self-regulation.
- **www.stiftung.bertelsmann.de**

Glossary

- **Internet Service Providers (ISP):** Services offering direct, full access to the Internet at a flat, monthly rate.
- **Chat rooms:** Maintained by online providers or systems such as Internet Relay Chat (IRC), they allow for real-time text conversation between users.
- **Usenet (Newsgroups):** Like a giant bulletin board where users post messages and information.

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A foreign sex tourist in a 'girly bar' in Pattaya (Thailand).

on September 9-11, the foundation will present "practical recommendations for government,industry and users to work together in developing a new culture of responsibility on the Internet." These involve improving mechanisms to deal with harmful and illegal content, namely hotlines as a feedback mechanism for users, voluntary codes of conduct among ISPs and software for rating and filtering purposes.

Rising public awareness

For now, hotlines are the main mechanism through which potentially illegal content is reported. Such hotlines exist in less than ten countries and are funded by government, industry, NGOs or a combination. Links with law enforcement are not always strong enough. The question of a privately funded line informing police about activities regarding a third party can, in some countries, be viewed as a breach of privacy. Saint Maur and French cyberspace lawyer Daniel Kahn both stress that governments should be the ones setting up hotlines, with direct transmission of the information to a central, specialized police unit. The British-based NGO ChildNet International is heading an initiative that aims to harmonize and improve co-operation among hotlines while encouraging new ones. The European Parliament is expected to adopt a policy by the end of the year that would encourage member states to set up specialized round-the-clock units to liaise with ISPs and law enforcement when alleged illegal material is reported.

The fact that reports to all hotlines are increasing points to rising public awareness of the issue. While industry is working on a number of rating and filtering initiatives,these are not deemed sophisticated enough to deal with child pornography. Aftab recently tested all the filtering materials on the market and found that none blocked out the list of illegal child pornography sites that she had compiled. Cyberangels now licences this list out to filtering software companies, but so far only one, Net Nanny, has acquired it. But filtering, even if it works, might protect children online but certainly not those whose images are being traded.

NGOs,industry and police stress the role of education, both for parents and children, in raising awareness and reporting illegal material. Aftab believes that children under 13 should not be taking part in unmonitored chat rooms, which software can block out. Awareness programmes also emphasize that schools should not be building web sites featuring pictures of children and divulging personal information about them. As head of the U.S. National Action Commitee for the *Innocence in Danger* initiative,Aftab has every intention of multiplying awareness initiatives, and already has giants like Microsoft and AOL on her side. Only a public groundswell can prompt governments to allocate more resources towards what is fundamentally a child protection issue. "Right now, it's possible to have a finger on the pulse," says O'Connell, cautioning against sensationalizing the problem. "If the threat becomes too large, these individuals will go further underground, to layers of the Internet where you won't be able to find them. It's only a matter of time before that actually happens." ■

SUNILA ABEYSEKERA: PEACE CAMPAIGNER ON A WAR-TORN ISLAND

Defying threats to her life, a UN award-winning Sri Lankan human rights activist has brought abuses in Sri Lanka to the attention of the international community (see box opposite page)

According to a recent United Nations study, Sri Lanka is the country with the second highest number of disappeared people in the world.[1] And yet there seems to be hardly any debate within the country about human rights violations. Why is this?

One of the biggest tragedies of Sri Lanka today is the existence of a culture of fear in both the majority Sinhala and the minority Tamil societies. Ethnic conflict (see timeline) and the war against Tamil militants have heavily militarized the society. In the last three decades,people in the north and east of the island have lived under the Sri Lankan army, the Indian Peacekeeping Force (IPKF) and different Tamil militant groups. Both inside and outside the conflict zones, civilians are used to living under difficult conditions, with official and unofficial curfews, house-to-house search operations,arrests,torture and detention as part of their everyday experience. Some civilians who openly spoke out against the violence and terror have been killed publicly by the army or by the militants. So there has been no way civilians could talk about human rights violations.

In the south, the situation is not much different. Thousands of Sinhala youths died when the government tried to suppress an insurgency launched to oppose the Indo-Lanka peace accord of 1987. In the years between 1987 and 1990, piles of bodies burning along the roadside became a common sight. Both the army and the insurgents were responsible for those massacres and disappearances.

In the context of such experiences, civilians in Sri Lanka fear that if you raise your voice against injustice, the punishment will be nothing less than death. Not intimidation, assault or imprisonment, but a very brutal death.Even today, people are being abducted, detained and tortured by the security forces and by para-military and militant groups. The culture of fear has given rise to a culture of silence. People are still afraid to talk about what happened between 1987 and 1990, or about what is going on today. Under existing conditions we cannot expect civilians to come forward to talk about the human rights abuses of the past and present. The challenge facing civil society in Sri Lanka now is how to break this culture of silence.

Although there has been extensive loss of life in the conflict in Sri Lanka, the international community has not taken a particularly strong line on this issue. What do you feel about this?

According to our estimates more than 100,000 people have been killed in Sri Lanka in the last two decades. It is a pity that our successive governments as well as the Tamil militant groups have not made sincere efforts to find a peaceful solution. If the international community had shown a little more interest and put pressure on the Sri Lankan government and the Tamil rebels, I think there could have been a negotiated settlement by this time.

Although Sri Lanka is in a state of war, the country continues to receive Western development aid. This money is supposed to be used for relief, reconstruction and rehabilitation. But how is it possible to undertake development work in the midst of a war? Probably, Western countries consider the Sri Lankan situation as a manageable conflict. If the situation becomes unmanageable, as in Kosovo or Rwanda, then I think there may be some kind of initiative.

In my view, there is also an element of racism and neo-colonialism involved in the West's lack of interest in the Sri Lankan

Sunila Abeysekera, flanked by UN High Commissioner for Human Rights Mary Robinson, receives a UN Human Rights award from Secretary-General Kofi Annan.

© Greg Kinch/UNDP

1. The United Nations Working Group on Enforced or Involuntary Disappearances says that over 12,000 Sri Lankans have gone missing since 1980 after being detained by security forces. Only Iraq, with 16,384 missing persons, had more cases of disappearances. The Sri Lankan government estimates the number of disappeared persons at around 17,000,while Sri Lankan human rights groups say more than 42,000 people have disappeared in the last two decades.

situation. If one white person had been abducted or killed in Sri Lanka, then the Western countries would have reacted differently. These are brown people killing brown people in a faraway country. Why should the West bother?

A few years ago, the Sri Lankan government formed commissions of inquiry to look into the disappearance of civilians and human rights violations. What have these led to?

In the 1990s, human rights groups in Sri Lanka and abroad launched a huge public campaign demanding an inquiry into the reported disappearance of over 42,000 people. As a result, the government formed a Presidential Commission of Inquiry (PCI) in 1992 to investigate the complaints. Since then there have been several other commissions on disappearances.

Thousands of families of the disappeared testified before the PCIs, which in turn submitted reports to the president. But the commissions lacked powers to initiate legal action against those found guilty. None of the reports has been made public so far. All the reports are lying with the presidential secretariat. Only the president has the authority to submit them to parliament.

In 1998, because of considerable pressure from the United Nations Human Rights Commission, civil society, the media and the international community, the government said it had initiated action against about 100 policemen who were implicated by the disappearances commission for the Central Province of Sri Lanka. This resulted from a list of over 1,000 complaints. Only one of the accused was a senior officer. The rest were junior officials.

Human rights groups have been calling for the commission to investigate further and expose those higher officials and politicians who actually gave orders for these abductions and killings. In the context of the on-going war, one has to understand the dependence of the political structures on the security machinery. From the state's point of view (not from mine), you can perhaps even justify formal impunity, but there cannot be a total denial of the reality of what has happened in Sri Lanka. If found guilty, politicians should be barred from holding public office and from contesting elections. This demand is not unprecedented. There are many examples, including Argentina, Chile, Guatemala, and El Salvador, of countries where various commissions named political bosses for human rights abuses.

Human rights groups were also successful in forcing the Sri Lankan government to allow a visit by Amnesty International and then by the United Nations working group on disappearances in 1991. That was the first time that the government recognized that there had been disappearances. It was a major breakthrough for the human rights movement in the country.

A VICTORIOUS STRUGGLE AGAINST INTIMIDATION

Intimidation is nothing new to 46-year-old Sunila Abeysekera, the Executive Director of INFORM, a leading Sri Lankan human rights organization set up in 1989. In 1988, when she was several months pregnant, death threats forced her to flee the country and seek refuge for a brief period in the Netherlands.

Her "crime" was to persistently demand accountability for human rights abuses and action against perpetrators of human rights abuse, regardless of their rank or position. She was on the hit list of the Janata Vimukti Peramuna (JVP), a militant leftist movement, in the mid-1970s, soon after her expulsion from the group. Her bold criticism of the movement's activities and a call for democracy and justice within the group had aroused the wrath of some senior members. But she weathered the storm and continued to work on her own for civil rights. "When everyone is criticizing you, then you are doing the right thing," Abeysekera says.

She was among the few members of the majority Sinhala community who established direct contact with Tamil women in the north and east of Sri Lanka after the outbreak of ethnic conflict in 1983. Working closely with her father, Charles Abeysekera, she highlighted human rights violations perpetrated by security forces under the guise of the Prevention of Terrorism Act and emergency rule in the country's Tamil-dominated north and east.

The Sri Lankan human rights situation attracted international attention after human rights NGOs in Sri Lanka, including INFORM, began to participate in the annual sessions of the UN Human Rights Commission in Geneva from 1992 onwards. Abeysekera's consistent presence at international human rights fora and the international focus she has brought to the human rights situation in Sri Lanka have helped to bring about some improvements. At the parliamentary elections in 1994 Sri Lankan political parties were forced to pledge that they would give top priority to improving the human rights situation if elected to office. "Though the promise has yet to be fulfilled, at least they recognized that there is a problem," she says.

Abeysekera, a mother of two, now lives in Colombo, working with INFORM and many other human rights and women's rights groups seeking peaceful and democratic change in Sri Lanka.

UN HUMAN RIGHTS AWARDS

On December 10, 1998, Sunila Abeysekera was honoured by the United Nations for her outstanding contribution to the struggle for human rights. With Angelina Acheg Atyam of Uganda, Jimmy Carter of the United States, Jose Gregori of Brazil, and Anna Sabatova of the Czech Republic, she received a UN Human Rights Prize at one of a series of events held at UN Headquarters in New York to mark the 50th anniversary of the adoption of the Universal Declaration of Human Rights.

Honorary in nature, the Human Rights Prizes were instituted by the General Assembly in 1966 and awarded for the first time in 1968 on the occasion of the commemoration of the 20th anniversary of the Universal Declaration of Human Rights. Since then, the prizes have been awarded in 1973, 1978, 1988 and 1993. Previous awardees include Nelson Mandela, Eleanor Roosevelt, U Thant and Dr Martin Luther King, Jr. ■

Sri Lanka has been witnessing violence for the last three decades. What impact has this had on women and how have they responded?

Women and children are the first victims of any kind of conflict. In Sri Lanka thousands of families have been displaced ▶

The war has left scars in northern and eastern Sri Lanka.

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TIMELINE

- **1948**
Sri Lanka gains independence from Britain.

- **1978**
An amendment to the constitution changes the parliamentary form of government to a French-style presidential system. The popularly elected president is head of state, chief executive, and commander in chief of the armed forces.

- **1983**
The Liberation Tigers of Tamil Eelam (LTTE), an armed guerrilla movement fighting for a separate homeland for Tamils, ambushes an army convoy killing 13 soldiers and triggering anti-Tamil riots all over the country in which more than 2,500 people are killed. In the ensuing ethnic crisis half a million Tamils leave the country to seek refuge in India and elsewhere.

- **1987**
India and Sri Lanka sign an accord to bring an end to the conflict. An Indian Peacekeeping Force (IPKF) is sent to the island to end the hostilities and supervise surrender of arms by the Tamil militants.

- **1989**
After a year-long battle with the LTTE, the IPKF returns to India. Soon after, the second "Eelam war" breaks out between government forces and the LTTE.

- **1991-92**
The Sri Lankan government allows a visit by the United Nations Working Group on Enforced or Involuntary Disappearances.

- **1993**
President Ranasinghe Premadasa is assassinated by a suicide bomber. Prime Minister D.B. Wijetunge is elected president.

- **1994**
The People's Alliance (PA), a coalition of parties headed by the Sri Lanka Freedom Party (SLFP), wins the parliamentary elections and forms a goverment. The leader of the PA, Chandrika Bandaranaike Kumaratunga, is sworn in as president after winning elections in November.

- **1995**
Failure of peace talks between Tamil rebels and the government. The LTTE launches major attacks against armed forces triggering the third Eelam war.

- **1997**
Sri Lanka ratifies the Optional Protocol to the International Covenant on Civil and Political Rights and establishes a permanent national Human Rights Commission (HRC) with a mandate to investigate human rights violations, including "disappearances".

© Sena Vidanagama/AFP, Paris

On May 18, 1999, demonstrators outside the office of Sri Lankan President Chandrika Kumaratunga demand the release of all prisoners of war and the opening of peace talks.

▶ from the north and east due to the violence. Men either join the army or the militant groups. The third option for them is to leave the country. It has been up to the women to keep families together and to take care of the children. There are about a million displaced people within Sri Lanka and most of them are women and children.

Many of these displaced women live in pitiful conditions in government-run camps. Because there is a shortage of food, clothing, medicine etc., they are forced to take up small-time jobs elsewhere. But they are not safe in their workplaces. The women are subjected to a lot of sexual harassment. As a result of the heavy militarization of the society, the incidence of violence in the north and south, particularly sexual violence against women, has increased alarmingly.

Communities are deeply divided by the conflict, and men respond by imposing more restrictions on women. This applies to Sinhala, Tamil and Muslim women. On the one hand, the conflict pushes women to become wage earners and to assume responsibility for the survival of their families. On the other hand, they are expected to conform to traditional values and safeguard the "image" and "identity" of the community.

Also, both the army and the militants recruit women for their forces. Some of them are even used as suicide bombers. This also has an impact on attitudes towards women in a society as traditional as ours. In a South Asian society, the fact that women receive military training and handle arms challenges existing attitudes towards women and images of them. This has both a negative and a positive impact.

At the same time, we also find women's groups playing an active role in fighting for peace and human rights. In 1986, the arrest of around 600 Tamil boys led to the creation of the "Mothers' Front", which organized protests in the streets of the northern town of Jaffna. They broke the barriers of a silence of many years, and paved the way for a renewed activism for human rights. Since then, women of all communities have come together in organizations seeking justice for disappearances and working for peace and reconciliation in a very critical way.

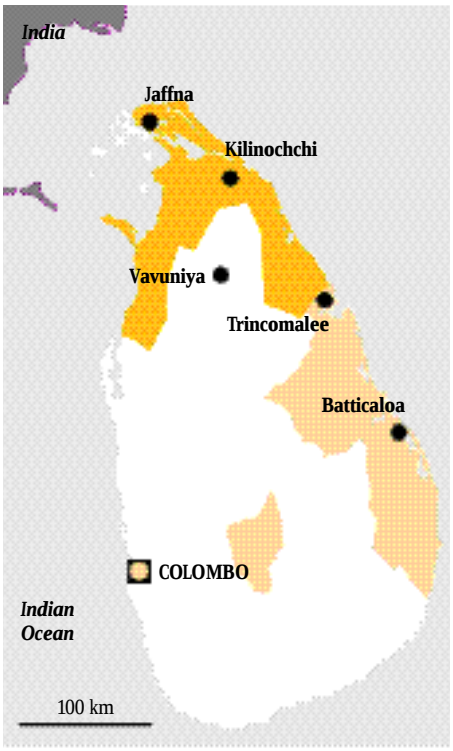
Conservative groups argue that by claiming equal rights for women, feminist groups are destroying ancient culture and tradition. Do you agree?

In South Asia we have this burden of an ancient past. All our political and nationalist movements have focused on the fact that we are people with a great heritage and a great civilization. There is no doubt that we have inherited from the past certain noble values which need to be protected. But how can you use religion and culture to justify discrimination against people on the basis of gender, religion and caste?

The conservatives' hold over society rests on their ability to wield control over women. More than ever before in history women have become the markers of the culture and traditions of a community. The easiest way to measure this is by looking at how a community imposes a dress code on women. We find stricter dress codes for women now than in the past. I think we are living in a socie-

COUNTRY INFORMATION

Name: Democratic Socialist Republic of Sri Lanka
Area: 65,610 sq.km
Capital: Colombo
Population: 18.2 million (Sinhalese 74%, Tamil 18%, Muslim 7%)
Languages: Sinhala, Tamil, English
Religions: Buddhism, Hinduism, Islam, Christianity
Currency: Sri Lanka rupee ($1 = 70 Sri Lanka rupees)
Literacy rate: 90%
GDP: $716 per capita
President: Chandrika Kumaratunga



Tamils: 95%

Tamils: 1/3, Muslims: 1/3, Sinhalese: 1/3

Source: *Le Monde*, August 6, 1998

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In June 1999, women in Chemmani village carry pictures of their missing loved ones as excavations begin at a common grave nearby.

ty that's becoming increasingly fundamentalist and puritanical.

Conservatives quote religion as an excuse to retain their control over women. I strongly believe that religious practices in South Asia have nothing to do with the philosophical framework offered by different religions, including Islam, Hinduism and Buddhism. They have to do with male religious leaders who interpret religious texts to suit their convenience.

The increased participation of women in the economic and political life of society is a challenge to existing cultural and traditional barriers. For example, the concept of the family is slowly being eroded as a result of economic and social changes that are beyond the control of any individual. Women are becoming independent, and men's role and the male hold over the family and society are being challenged by the processes of globalization. Hence there is criticism of women's claims for equal rights and equal treatment.

What role have peace movements and human rights groups played in Sri Lanka?

Human rights and peace movements have been trying to create a small space within a heavily militarized society. They work closely with the media, academics and cultural workers to spread the ideas of peace and civil rights. We hope that as an influential community within society they will have the courage to speak out.

In 1998 we saw the emergence of two alliances of non-governmental organizations working for peace and a negotiated solution to the ethnic conflict. One is the National Alliance for Peace (NAP), consisting of representatives from Tamil, Muslim and Sinhala communities, and the other is the Interreligious Alliance, which includes Catholic and Anglican bishops and Buddhist monks. Together they visited several areas of the north and the central provinces in 1998 and also held talks with the Tamil militants.

A big rally was organized in Colombo in February this year by the two groups. For the first time we had Hindu, Christian and Buddhist clergy on the same platform and all of them spoke of the need for peace. This is a very positive development. There is a growing realization that you have to negotiate with the Liberation Tigers of Tamil Eelam (see timeline, opposite page) in order to move towards any kind of democratic and peaceful settlement of the ethnic conflict in Sri Lanka. This kind of intervention is small but critical at a moment when ordinary citizens are afraid to talk.

It can't be easy to be a human rights activist in a heavily militarized society...

You are right. When I started working on human rights two decades ago it was not easy. One is regarded as a trouble-maker, sometimes as a traitor. Questioning the role of the government and of the different political actors in destroying democratic structures and creating a militaristic environment led to attacks from all sides.

In general, human rights activists in Sri Lanka are working under extreme pressure. Human rights abuses are committed by many actors, and we must be critical of all ▶

of them. Training people to document human rights abuses, bringing cases before the law, providing support for victims, all this is a part of our work. Monitoring and intervening in human rights abuses in the north and east is especially difficult. We do not easily acquire permission to visit areas under the control of the militants. If there are reports of human rights abuses in those areas, we go at the risk of our lives. We are barred from having direct contacts with the Tamil militants because of the Prevention of Terrorism Act (PTA), which makes our work even more difficult.

Over the years, we have built up a good network of groups all over the country—peace committees, religious groups, community organizations and women's groups—who send us information and provide support.

Some individuals living in the troubled areas pass on information to us. If necessary, they travel to neighbouring areas on fact-finding missions, sometimes risking their lives.

Apart from attracting international attention to disappearances, what are your achievements in human rights work?

I consider my consistent involvement in various campaigns over the last 20 years and acceptance by different networks of grass-roots organizations and movements, both Sinhala and Tamil, as itself a major achievement. The UN award, I feel, is a symbolic vindication of the work I have done all these years.

Our group, INFORM, co-ordinates with many other groups and organizations in launching human rights campaigns. In 1997, we were part of a campaign calling for action against soldiers who raped and killed a Tamil schoolgirl, Krishanti Kumaraswamy, while she was in custody. Her mother, brother and a neighbour who went looking for her were also murdered. The persistent demands finally forced the government to initiate legal proceedings against the suspects. Six of the accused were sentenced to death in 1998. That was a landmark verdict and was the first time there had been some kind of prosecution against army personnel. I think the credit should go to all the human rights groups.

What are the chances of reconciliation after 20 years of ethnic conflict?

That's a difficult question. As a human rights activist I can say that it is possible for all communities in Sri Lanka to live together with dignity and respect. To achieve that, leaders of all communities should come forward to make a new beginning through the processes of forgiveness and reconciliation.

There should be an acceptance that all sides have committed horrendous crimes. Then we have to move beyond that. If people are going to dwell on the past, then there can be no solution. We have come out of a particularly bad and horrifying period in our history. The older generation from all the communities still remember how they lived together happily in the past. It is the younger generation which has witnessed war, separation and suffering. If the situation is allowed to drift, then there is no chance for peace in Sri Lanka.

We all know that even if the war comes to an end tomorrow, peace will not return unless the people from all communities are willing to accept the past, forgive each other and go back to living together. For this we need a new democratic political structure and legal safeguards for the rights of all communities. ■

Interview by Ethirajan Anbarasan

UNESCO Courier journalist

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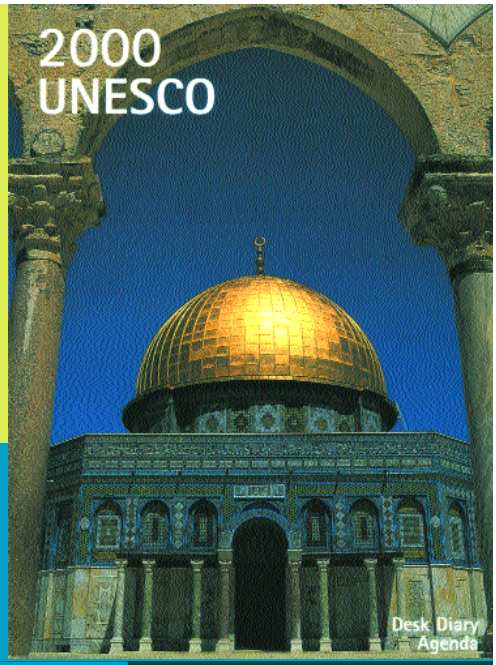

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